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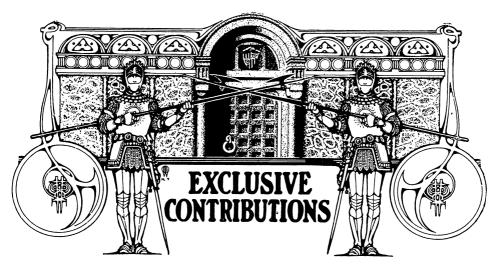
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The Technique of Inlay Making by the Direct and Indirect Method.

By F. T. VAN WOERT, M.D.S., Brooklyn.

The direct method in porcelain inlay work means the forming of the matrix directly in the natural tooth cavity by burnishing or other manipulation of a suitable gold or platinum foil, thus producing a form or mold in which to fuse the porcelain; and in making a gold inlay it is the forming of a complete wax filling (or pattern) directly in the original cavity.

The indirect method means the taking of an impression of the original cavity in some suitable material, and making from this impression a die, which is used for forming the matrix (for porcelain) or wax pattern (for gold).

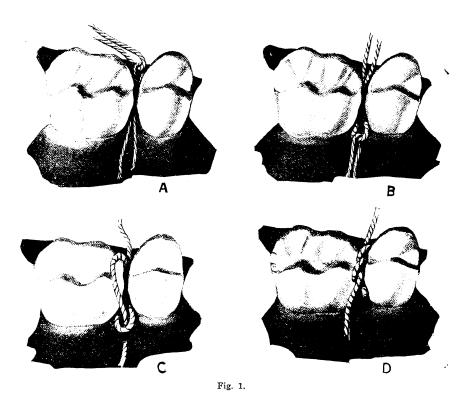
There are many advocates of both methods of procedure, and many good arguments for or against either. It is the purpose of these articles to so analyze both that if possible we may prove the advantages of either one or the other or perhaps both of them.

Best Method of Separating Ceeth.

The first requirement in all cases, whether for one method or the other, is the securing of a suitable space or separation where the cavities are located between the teeth or under the free margin of the gum.



The old methods of using the rubber strips, orange wood or cotton, have been entirely abandoned by me, for the better method of using the ligature silk in most cases. This has the advantage of being inconspicuous and maintains its proper position without producing soreness, at the same time accomplishing fully as much as any of the old methods mentioned.



Its application is as follows: Cut a piece of ligature silk of suitable size, about ten or twelve inches long (this ligature silk comes in several sizes, Nos. 5 and 6 being most useful for separating). Double the silk and pass through the loop a piece of waxed floss of about the same length to act as a leader (Fig. 1, a). This is passed between the teeth to be separated and the ligature silk drawn through below the contact points and above the gum septum by the wax floss leader (Fig. 1, b), and a loop and knot made as shown in Fig. 1, c and d.

The absorption of moisture by the ligature silk causes it to contract, in doing which the teeth are gradually pushed apart or separated. This



method was devised by Dr. Ottolengui and is without doubt the most practical method of separating teeth known up to the present time.*

Seatangle Cent for Separating Ceeth. There are cases where extensive caries may have caused the leaning of two teeth, say a bicuspid and molar (Fig. 2, a), or two molars, necessitating very extensive separation to place them in anything like a normal position. In such cases I have obtained

most satisfactory results by removing the superficial decay and filling the

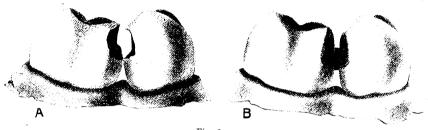


Fig. 2.

cavities with Calixine cement, then inserting a small piece of seatangle tent at the point of separation, as shown in Fig. 2, b.

I believe this method was devised by Dr. Johnson of Brooklyn. It would be better to experiment with this material before putting it to a practical application. It is procurable at most drug stores or of any of the surgical supply houses, and comes in the form of short pencils in a variety of sizes. The expansion is in its diameter and not its length. By cutting off a small piece and throwing it into a glass of water for a couple of hours, its expansive force will become very apparent.

Immediate or mechanical separators are invaluable where indicated, which is surely not in the case of normally retained teeth, as the pressure necessary for the movement of such teeth is more than should be applied in so short a space of time.

In cases where cavities have extended below the free margin of the gum, a compress of temporary stopping should be worn long enough to accomplish the displacement of the tissue and to allow it to heal, thus avoiding hemorrhage and making accessible an otherwise inaccessible cavity margin.

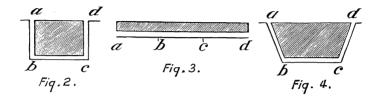
^{*}Dr. Van Woert gives me undue credit. The method was original with me, but was equally original with a number of others. Its utility is well exemplified by the statement that such ligature loops may be placed both mesially and distally of first permanent molars in one jaw, thus at one time opening up four spaces with little or no inconvenience to young patients.—R. Ottolengui.



Cavity Preparation.

The next consideration for all inlay work, whether it be by the direct or indirect method, is suitable cavity preparation; and in all cases cavities should be so formed as to allow of easy draft; and

in the case of porcelain, in so far as possible to compensate for the thickness of the gold used as a matrix after its removal from the inlay. The principles involved in preparation of cavities of compensating form were described by Dr. Ottolengui in 1904 (see Items of Interest, Jan., 1904) in an article from which I quote the following:



"It is possible to so arrange a cavity that, while at all other parts the cementing medium surrounding the inlay may occupy at least as much, or even more space, than did the matrix, along the margins the joint may be made so close that the space will be considerably less than the thickness of the matrix material, and in some cases may even be brought into actual contact.*

"Imagine a cavity having the shape of a perfect cube, that is to say with sides actually parallel with one another and rising at right angles with the bottom (Fig. 3). Suppose this box-shaped cavity to be evenly lined with a layer of either gold or platinum, and this lining removed without alteration of shape, to be used as a matrix. Then suppose that the porcelain is accurately fused, producing a perfect cube. If we strip the matrix from this tube of porcelain and drop the same accurately into the cavity, examination will show that it can be brought into actual contact with the bottom or floor, but that space will exist at all four sides. Lateral movement will bring the block into contact with two other sides in addition to the floor (the space at the opposite sides of course being doubled), but no manipulation will produce contact at all four sides. Thus the margin must of necessity be open as wide as the thickness of the matrix throughout one-half of the margin at least.

"This shows that in cavities surrounded by tooth substance, as in approximal cavities, in incisors which do not reach the incisal angle, as well

^{*}The underlying principle now to be discussed was communicated to me by ${\rm Dr.}\ {\rm J.}\ {\rm E.}\ {\rm Nyman}$ in conversation.—R. O.



as in labial cavities, the preparation of margins at right angles with the adjacent surfaces is erroneous.

"We have seen that the cube dropped into the box comes into actual contact with the bottom. It follows that if the sidse are flattened out to the same plane (Fig. 4), a mass of porcelain fused on a piece of metal which had been adapted to such a surface would come into contact throughout. Thus it follows that the nearer the sides of a cavity approach the same plane as the floor, the more accurate will be the adaptation of the porcelain to the cavity surface. But this flattening of the cavity leaves us more and more dependent upon the cement for retention, since the flatter the surface the less mechanical source of retention we will have. There is little doubt that the first form, the cubical cavity with sides at right angles to the floor, will afford the greatest opportunity for retention; the second, where the cavity is entirely flat, offers the least retentive quality even though it gives us the closest joint.

"If we form the cavity, with the walls inclined at an angle of forty-five degrees (Fig. 5), we make a compromise. The retention is worse than in the cubical form and better than in the flat; but conversely, the joint is better than in the right angled cavity, though worse than in the flat. If an inlay for such a cavity is dropped into place till in contact with the bottom (b to c), the space left at the margins (a and d) will be just one-half the thickness of the matrix used. It follows, therefore, that if the bottom of the inlay be ground off to the extent of half the thickness of the matrix, the whole inlay may be brought into contact with the cavity at all parts.

Influence of the Cement.

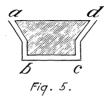
"For a moment it would seem that this is the best result obtainable; but further analysis shows that it is not. And here we come to the influence upon cavity preparation which the cement will have. We

have shown that in the first cavity, the cube-shaped, the inlay can be brought into contact with the floor (b to c); but this is only true in the absence of an interposing substance. If cement be first placed in the cavity, the cubical block of porcelain can no longer with reasonable force be pressed against the bottom, because the lateral walls rising at right angles (angles a, b, c and d, c, b) will imprison the cement between the inlay and the cavity bottom and prevent its displacement. Thus this form of cavity, though having the greatest powers of retention, will nevertheless produce an inlay surrounded by the maximum quantity of cement. In the flat cavity, the greatest quantity of cement can be displaced as exit is afforded at all sides, so that the thinnest residuum of cement would remain at the joint (a and d) and between the inlay and the cavity surface. In the third form, where the walls are made flaring at an obtuse



angle, we would be able to displace a greater portion of the cement because of the lessened resistance of the walls, than in the case of the cubical form, and we would get a much closer joint, but we would have at the same time less retentive strength.

"Can we do even better than this? I have said that analysis shows that we can. We may do this by inclining the wall only to one-half the depth of the cavity (Fig. 6). Thus the lower part of the inlay would fit as did the cube, while the upper part, with the walls now flaring off, would



give us opportunity for a closer joint along the margins. The resulting inlay would have a form diagrammatically similar to the head and part of the shank of a screw. Theoretically this would not obtain so good a joint as where the flare of the walls reached fully to the bottom, because the lower right angles would still imprison the cement and prevent forcing the inlay tightly to place. Practically, however, this is overcome by grinding from the extreme bottom of the inlay so that contact along the flare of the walls could be reached before the actual bottom of the cavity were touched. In practice also we would not have actual angles.

"These, it must be understood, are underlying physical principles Their application to practical work must be modified to meet the characteristics of the material with which we deal. For example, however desirable it might be theoretically to flare the walls to an inclination of forty-five degrees, in many instances this would produce too weak an edge of porcelain. Judgment, therefore, must be used, and the departure from the right angle formation must depend upon the masticatory stress which is to be met."

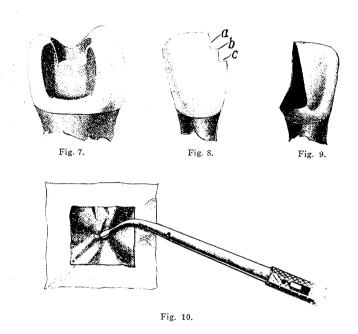
All steps should be rounded at the point of turn and all margins should be as near right angles as possible to minimize the reflection of cement at such points, and wherever possible cavities should be so shaped as to form a dovetail or lock (see Fig. 7).

In no instance should steps be made along the margin of the cavity (Fig. 8). The least complication in cavity formation the better the chances of a successful inlay (see Fig. 9).

Fig. 8 shows a cavity preparation advocated by many, which I think theroughly impracticable, because at the points a, b and c it is nearly if



not quite impossible to get a perfect matrix. And if by chance one is obtained, the change that takes place in the porcelain while fusing prohibits the possibility of its fitting the various angles, particularly at the points mentioned. On the other hand, when cavities are so formed that there is a compensation for the changes mentioned, a very much more



satisfactory result is obtained, as shown in Fig. 9. In this the margins are made of straight and curved lines, without being abrupt or at right angles. This principle is very important, and compensating lines and curves should be used for all porcelain fillings. The result will be a closer adaptation of the filling to the cavity, and I believe them to be much stronger. Moreover, the chances for blending of colors or shading will be limited only to the ability of the individual operator. The operator's labors are minimized as well as the strain upon the patient.

Obtaining the Matrix.

The cavity represented in Fig. 9 is, of course, a simple one in which to mold a matrix, but it is just as easy to err in this operation as it is a simple operation. My experience leads me to believe the

following combination of several methods to be the best:

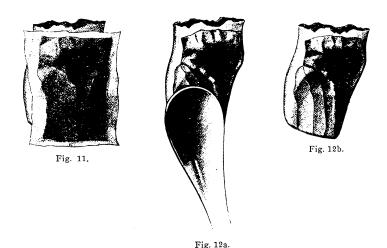
First, wherever possible the rubber dam should be used, that the cavity may be kept perfectly dry. Select a suitable piece of foil; this is placed



upon a piece of china silk or very thin gold-beater's skin and held with foil carriers (Fig. 10).

The following is quoted from ITEMS OF INTEREST, April, 1906.

"I recently received from Dr. Emil Schreier, of Vienna, a suggestion which, after trial, I unhesitatingly pronounce to be one of exceeding value in the technique of all kinds of inlay fillings. There can be no doubt but



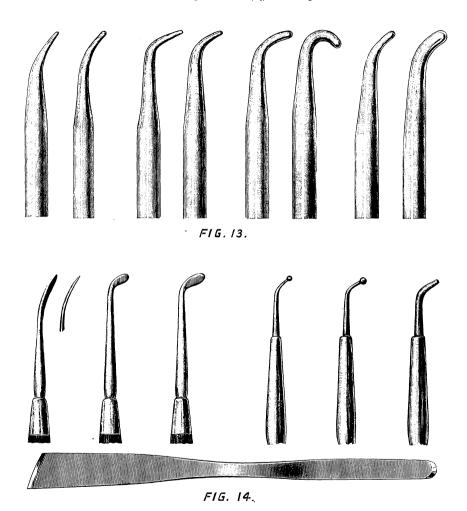
that the stability of an inlay is much enhanced by the depth to which it may be introduced into the cavity. Heretofore in very deep cavities it has been necessary to lessen by strata of cement or other material. Dr. Schreier suggests the use of what is known as gold-beaters' skin. This is an exceedingly thin bladderlike material which gold-beaters use when beating the metal into foil to avoid tearing.

"In making a matrix the gold-beaters' skin is placed on the under side of the foil and therefore next to the cavity walls. With ordinary care the gold can thus be forced to a very considerable depth without tearing. After the edges are thoroughly burnished the gold-beaters' skin is easily removed and the matrix can be returned to the cavity for a final adaptation to the walls.

"In the production of either porcelain or gold inlays by the so-called impression method the gold-beaters' skin is of equal value, as the matrix material can be forced into deeper grooves and undercuts without tearing than can be done without this protection, as the gold-beaters' skin acts as a cradle to support the matrix while it is being carried into place."



The foil is placed over the cavity, with the silk or sheepskin next to the cavity and foil on top, as shown in Fig. 11. With spunk or wet cotton force both well down into the cavity, adapting it as close to the walls as possible; then remove and separate the gold or platinum from the silk



or skin, replace the matrix into the cavity and with a small ball of unvulcanized rubber, which has been well coated with lycopodium, press the metal well into the cavity and over the margins, leaving the rubber in its place. Burnish the flaps or surplus metal down towards the opposite side

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of the tooth both buccally and lingually and tack them in that position with a hard, sticky wax, or hard Canada balsam. This, of course, is done by melting it to place with a small heated spatula (Fig. 12, a). Remove the rubber and you will find the matrix held firmly to place (Fig. 12, b) and ready for final adjustment, which I find is best accomplished by the use of the glass burnishers devised by Dr. Weber of Switzerland and sent to me by Dr. Jenkins of Dresden, Germany (Fig. 13). Fig. 14 shows three steel burnishers and three made of tungsten, which is much better



Fig. 15.

than steel, and a manicure knife. The latter is used to cut the metal matrix free from its wax or balsam attachment. It is particularly well adapted for that purpose because of its shape.

These burnishers and instruments should be used as little as possible, the operator depending almost entirely upon the swedging process. The reason is that swedged metal warps or pulls very much less when heated than burnished metal does.

Removal of Matrix. The matrix now being ready for removal a small piece of paraffin wax such as is used for base plate is softened by manipulation of the thumb and first finger, shaping it in the form of a cone. This is

pressed into the matrix, filling it completely, and all surplus removed with a warm spatula of the same shape as that illustrated in Fig. 12. The wax should then be cooled with compressed air and the matrix trimmed or cut with the manicure knife, described above and shown in Fig. 14, using the square edge of the knife in the labial surface and the round edge at its lingual.

This matrix may now be removed from the cavity and invested in Pelton's investment, No. 2. The investment should be put into a small platinum pan, as represented in Fig. 15.



Platinum Investment Pans.

This pan is very easily made by taking a square of No. 30 G. platinum and bending to shape with flat-nose pliers, leaving the corners projecting for ease in handling (Fig. 15). The bottom is perforated by placing the pan upon a flat piece of lead

and driving a sharp-pointed instrument through with a light hammer, which produces a burr on the bottom of the pan. This holds the bottom free from direct contact with the furnace, and also provides for the escape of steam during the process of drying out.

After the matrix has been invested and the investment has set the paraffin wax should be removed, either by slightly warming over a Bunsen flame or washing it out with scalding hot water. The case can then be set upon the shelf at the furnace entrance and left to dry out.

Fusing of Porcelain.

The fusing of porcelain in unprotected or uninvested matrices I consider a great mistake, as the shrinkage of the porcelain is sure to distort or pull the matrix out of shape. The extent of distortion

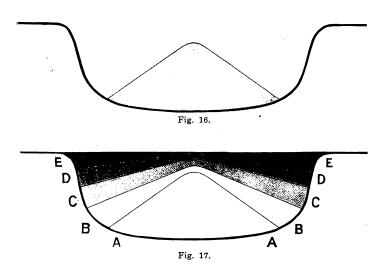
will depend upon how the fusing is done; that is to say, at what temperature. It is a fact that all high or low-fusing porcelains will fuse at a very much lower temperature than they are rated at by the manufacturers, the difference being in the amount of time required to accomplish the result. It is also a fact that any of the porcelain now upon the market will yield a very much more perfect result when fused at the lowest possible temperature. First, it has more strength. Second, a better translucency. Third, it may be ground and polished without danger of etching after its insertion. Fourth, its color is permanent and makes possible a selection for a given case with little difficulty; and when blending of two or more colors is required this is limited only by the ability of the individual operator. Fifth, the only change in shape of an inlay is the shrinkage characteristic of each material; and when a method of construction is employed which reduces the shrinkage to a minimum at the margin the change is hardly perceptible. The method which has given me the best result is as follows:

For the first two or three layers porcelain should be mixed with water to a thick creamy consistency. The first portion of the matrix to be covered should be its floor or lowest point. The porcelain should be placed in the form of a mound or pyramid, as shown in Fig. 16.

This should be fused to a biscuit, at which stage the maximum amount of shrinkage takes place. Each additional layer should be placed in the order, as shown in Fig. 17, a, b, c, d and e (the number of layers depending upon the size and shape of the cavity). From a to e you will note a gradually diminishing amount of material for shinkage at the



margin. Hence, if in the final fusing the matrix is pulled to the full shrinkage, it is so minute, as stated above that it is hardly perceptible It should be understood that in layers a to b in no case should the fusing be carried beyond the biscuit point. And in the final layer e the inlay should be fused to a glazed (not glassy) surface, preferably slightly granular rather than very smooth.



The further treatment of porcelain, such as cementation, etc., will be dealt with in a later chapter.

Direct Method for Cast Gold Inlays. The direct method for cast gold fillings is very much simpler than in porcelain inlay work; at the same time it requires just as accurate and exacting care in details as the former.

The cavity preparation may be varied somewhat because of the added strength of the inlay. That is to say, where dovetails or locks are formed in the cavity preparation they do not require so much depth; in fact they can be made smaller in every way.

Wax for Inlay Patterns. Probably the most important consideration in making a wax pattern directly in a cavity in a tooth is in securing a suitable wax; one possessing qualities that will permit of softening without disintegra-

tion, and at a temperature low enough not to cause irritation of the pulp of the tooth, that is free from any adhesive qualities and with resistance enough to carry it to all parts of the cavity and the cavity margin, without splitting or cracking when forced into position by the opposing teeth.



Ail these qualities will be found in the Taggart Inlay Wax, which is the only wax that I know of possessing all of these requirements. But even this wax, if not properly heated in the process of softening, will be found very unsatisfactory. Those who are fortunate enough to have such an instrument as the electric wax heater, devised by Dr. Taggart, for annealing or softening the wax are to be congratulated, and need have no anxiety in so far as this part of the operation is concerned. The majority of us have to devise some other method for the warming of the wax to



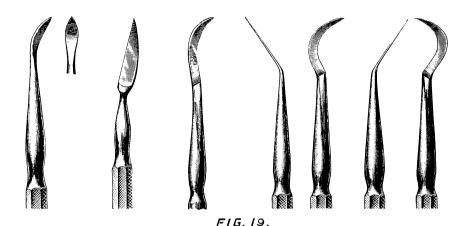
Fig. 18.

a proper consistency, and perhaps one of the simplest and safest methods is to immerse it into warm water, kept at nearly an even temperature. This is best accomplished in one of the electric atomizers and water heaters. The cone or form of wax should be fastened to the point of any small instrument, that it may be carried to the bottom of the vehicle and kept submerged in it until required for placing in the cavity. Another good method (suggested by Dr. Taggart) is to use a large cork and attach the wax, with a pin, to the under side of the cork, which floats on the heated water, keeping the wax submerged (Fig. 18).

My observation is that a large number of practitioners are in the habit of using vaseline, or some similar material as a lubricant in the cavity, to permit of the easier withdrawal of the wax filling when completed. I think this is a great mistake. It is better to depend upon the saliva, which is all that is necessary.



After the wax is warmed and ready for insertion it should be placed with the small end of the cone against the pulpal wall and gradually but continuously forced into position with the thumb or first finger. Then the patient should be directed to bite upon it, bringing the teeth together in normal occlusion very slowly. Then he should be instructed to produce a triturating movement of the teeth to get all high places worked off. Unless this is done, the filling will not occlude properly with the opposing teeth, and during the act of mastication such fillings



are very uncomfortable and require a considerable time to adjust themselves by condensation to the proper occlusion, in doing which there is danger in many cases of fracturing the tooth. I personally have seen a number of molars split at the bifurcation from this cause.

Carving the Patterns to Proper Form.

The wax having been forced into proper position, and proper bite secured, it should be chilled and carved in the following manner: First, all the surplus on the buccal and lingual surfaces should be removed with a good sharp knife (the one illus-

trated in Fig. 19 I have found very useful). Next, the occlusal surface should be trimmed to the margins of that portion of the cavity, after which it is well to chill the wax again and then carve the filling upon the approximal surface and at the cervix, leaving the knuckle in contact with the adjoining tooth until the filling has been properly smoothed and polished, using for the trimming at the cervix, etc., such knives and instruments as are shown in Fig. 19.



Polishing the Wax Pattern. The finishing and polishing of the filling should be done with oil of cajuput and Nos. 1, 2 and 3 sable art brushes. If the cajuput is put into a sal-mouth or small varnish bottle, first fill the bottle loosely with absorbent cotton and pour enough cajuput

upon it to saturate, which will prevent the brush when inserted into it from being flooded, while supplying it with just enough of the oil for the purpose required (Fig. 20). All knife and instrument marks are

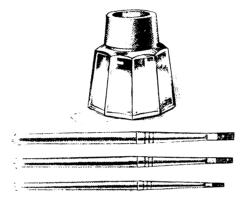


Fig. 20.

easily removed by just brushing the surfaces with the cajuput, as it is a solvent for the wax. After all of the instrument marks are removed, then the remaining contact with the adjoining tooth should be trimmed and shaped for proper contact and the whole filling given a coat of cajuput oil with just enough brushing to cover it. This should stand for two or three minutes, and if convenient throw a blast of cold air upon it and it will harden with a very smooth and polished surface.

Next a suitable place is selected on the wax filling for the insertion of the sprue, which, if possible, should be attached before the wax filling has been disengaged from its seat in the cavity.





The Influence Exerted by the Dental Arches in Regard to Respiration and General Health.

By Mathew H. Cryer, M.D., D.D.S., Philadelphia, Pa.
Professor of Oral Surgery, University of Pennsylvania.

Read before the American Society of Orthodontists, Chicago, July, 1912.

The principal object of this paper is to show that great improvement can be brought about in respiration, both nasal and oral, by widening the dental arches. This will also produce a change for the better in the nasal cavity and its accessory sinuses with the drainage and ventilation of these spaces, all of which will tend to improve the health of the patient. This improvement can take place regardless of opening the suture in the region of the maxillæ.

In order to speak intelligently on this important matter, one should know the difference between normal and abnormal respiration. One must also know the anatomy of the respiratory tract, especially of that portion which gives passage to the air from the nostrils through the nasal chamber to the glottis, and from the lips through the mouth to the glottis.

Influence of Congue on Normal Respiration.

In the first place, normal respiration is not carried on alone through the nasal chamber. When one is at rest, the breathing is carried on through this channel if the respiratory tract be normal anatomically and physiologically; but when the normal per-

son becomes active, he breathes through the mouth as well as through the nose, in proportion to the amount of exertion used. In talking and singing, it is absolutely necessary to breathe through the mouth. In fast running, in jumping, or in swimming, the mouth is again a very im-



portant respiratory passage. If the dental arches be narrow, the tongue will be forced backward into the pharynx and obstruct breathing, especially through the nose, and a person with such dental arches could never become a champion in athletics, no matter how great might be the width of the floor of the nasal chamber.



Fig. 1.

Development of the Jaws.

It may be advisable here to give a brief review of the development of the upper and lower jaws. We find that the bones of the brain case are in an advanced stage of development before the facial

bones commence to build. To such an extent is this the case that the dermoid structures are nearly in contact with all of that portion of the head below and anterior to the notochord. At this time there is no opening into the alimentary canal.

The facial bones arise from the under surface of the brain case, from certain processes that push outward and downward, leaving a layer of dermoid tissue on their inner as well as their outward surfaces. This dermoid tissue becomes the mucous or epidermal lining of the mouth, the nasal cavities, and all internal surfaces of the face.



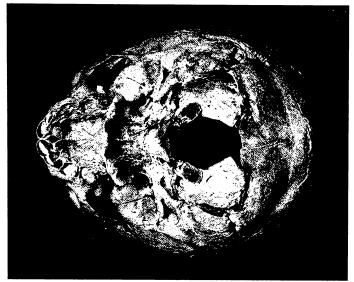


Fig. 3.

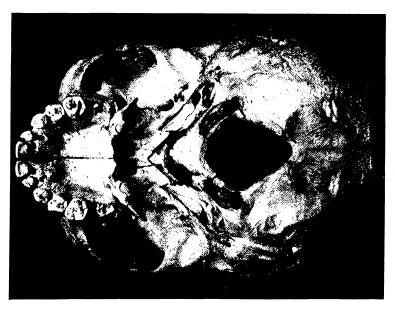


Fig. 2.



It is from this dermoid tissue that the teeth and alveolar processes take their origin, and not from the developing buds or processes that form the remainder of the bones of the face. It is for this reason that when the teeth are lost and there is no function for the alveolar process to perform, it is also lost. It is for this reason, also, that when the dermoid tissues are attacked by systemic diseases, such as syphilis, scarlet fever,

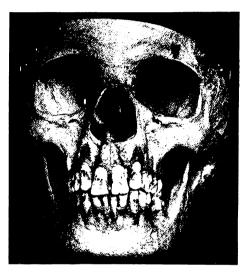


Fig. 4.

etc., the teeth and alveolar processes are involved simultaneously with the skin, as are also the bones of the face, which were covered originally with this dermoid tissue. It is quite possible that pyorrhea alveolaris may also be a manifestation of a dermoid disease.

When the dermoid appendages are entirely lacking at birth, and do not develop later on, the alveolar process will also be lacking.

Che Intermaxillary Suture. The processes in front which push down and forward are called fronto-nasal; those on the side, maxillary and mandibular; those situated deeply within the face are known as spheno-ethmoid prolongations. It is the general tendency of these buds

forming the upper and lower jaws to send processes toward the median line which form a union with their fellows of the opposite side. The bonds of these unions vary according to circumstances, depending upon their position, function, and the age of the individual. In the interpremaxillary suture there is but the slightest bond between the two halves;

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there are no bonds or fibres passing over the suture from one side to the other. The suture is shown by the X-ray to sometimes remain partially open throughout life. During the growing period the bonds of union in the sutures are made of uncalcified connective tissue, and even late in life the X-ray often passes through the suture as the deposit of calcic salts in the tissue is so slight.

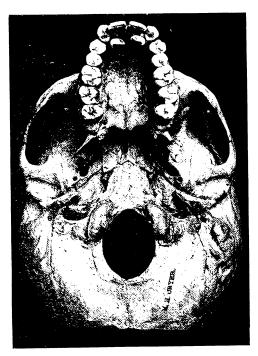


Fig. 5.

Etiology of narrow Hrches.

Keeping in mind this process of development, it is a question whether the narrow dental arch is in itself pathological, or whether it is a morbid anatomical condition produced by an early pathologi-

cal process, in which case we would find various disturbances and abnormalities in other structures of a similar or closely related development. But whether accepted as a cause or as a result, it is quite certain that an abnormally narrow dental arch is a detriment to the general health, preventing as it does free respiration, drainage and ventilation of the nasal chamber. So there is an urgent necessity for those in charge of the mouth to widen narrow dental arches whenever possible.



Importance of Widening Narrow Arches.

For about thirty-six years, I have recognized the fact that widening narrow dental arches would improve respiration, but I have not observed any evidences that this result was obtained by opening the intermaxillary sature.



Fig. 6.

The face seems to be built upon a true architectural basis. The intermaxillary suture is so protected and held in position by the facial and cranial bones which act as abutments, with flying buttresses and other braces, that it has always seemed to me to be impossible to open this suture by any force applied to the teeth, especially as the teeth are held in position only by the yielding alveolar process.

A number of pictures have been shown and cases cited by many men of ability, who claim to have opened this suture, but the only optical evidence I have personally been able to find shows that it is the interpremaxillary suture that has been widened, and not the true intermaxillary, which is quite a different thing. Of course, there may be con-



ditions in which the bone is so undercalcified that these braces might yield and permit the separation of the palatal process, but in my opinion this cannot take place when the bones of the face are normally calcified.

Influence of the Congue in Respiration. Now to come back to the improvement of the general health and respiration by the widening of the dental arches.

In normal people with normal arches the tongue fills the whole mouth, and extends back into the oro-

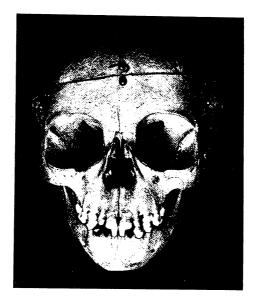


Fig. 7.

pharynx almost to the post-pharyngeal wall, against which the soft palate and epiglottis slightly rest. Interfere with the tongue by compressing it between narrow dental arches and you will see that it is forced in the direction of least resistance, which is back into the oro-pharynx. This pushes up the soft palate against the post-pharyngeal wall, cutting off respiration through the nose and blocking drainage and ventilation of the same. As the tongue forces the epiglottis downward and back it also interferes with oral respiration, which, however, is a little easier than nasal respiration under these circumstances; hence, "mouth breathing." Now, when the dentist spreads these narrow arches, it gives more room for the tongue, which moves forward, taking its normal position, and in



turn releases the pressure on the soft palate and other structures, thus permitting nasal respiration, thorough ventilation and drainage. all of which conduces to an improved condition of the general health. This, gentlemen, is in my opinion the reason why spreading the dental arch is so

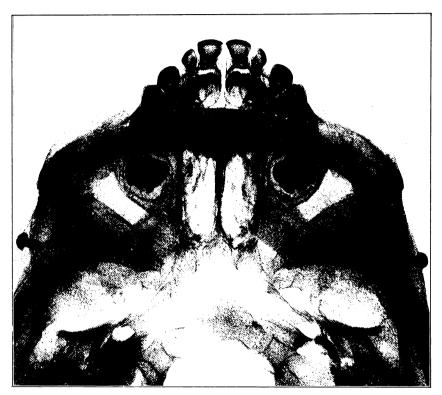


Fig. S.

beneficial, not because, as some think, the intermaxillary suture is opened and the floor of the nose widened, but because the unruly tongue is given the room it requires, and is not pushed against the soft tissue at the back of the mouth.

The following illustrations will make clear the various points I have endeavored to bring out:

Fig. 1 is made from the skull of a person about 20 years of age, showing its under surface, without the mandible. It is not necessary to go into a detailed description of the specimen to the members of this society, but I would like you to observe the position of the intermax-

23



illary suture, extending from the interpalatal suture to the anterior palatine fossa. The malar processes, the malar bones, and the zygomatic arches, with their attachments to the sides of the brain case, form the lateral abuttments, which are braced in addition by the pterygoid processes and the vertical plates of the palate bones. These bones

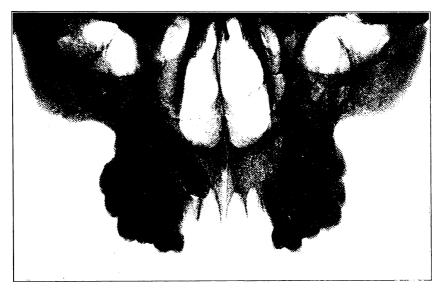


Fig. 9.

are permanent structures, and are of comparativly hard tissue, quite different from the alveolar process, whose function it is to hold the teeth in position, often for a short time only. From a study of the architectural perfection of these structures as they hold the true maxillary bones firmly in position, does it seem probable that this suture could be opened by a force applied to the teeth, placed as they are in the yielding structure of the alveolar process?

Fig. 2 is made from the skull of a child 4 or 5 years of age. It shows the seven sutures in the roof of the mouth, which is the number usually found. The one extending from the horizontal plates of the palate bones to the anterior palatine fossa is the intermaxillary suture under consideration. Three other sutures radiate from this fossa. That going forward between the two central incisor teeth is known as the interpremaxillary suture, and is the one so often confused with the intermaxillary suture.

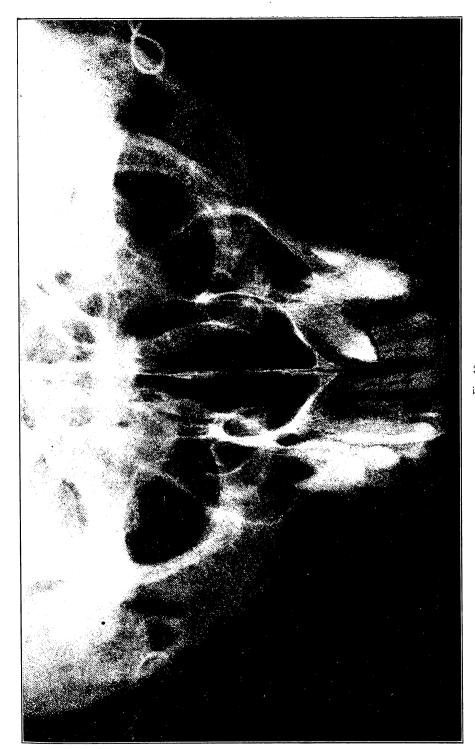


Fig. 10.



In a paper read before this society on June 12, 1901. Prof. Paul Albrecht spoke of more than seven sutures, among them being two passing between the central and lateral incisors. Fig. 3 would support this view.

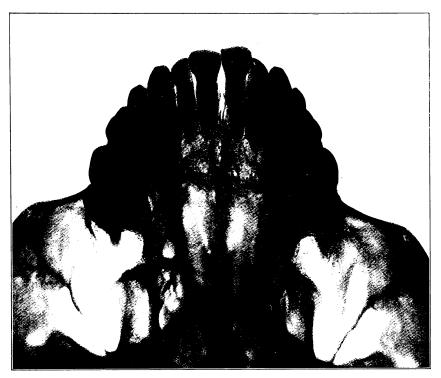


Fig. 11.

Fig. 4 is made from a skull showing that the lateral incisor teeth are missing from their usual position; the alveolar processes of the two central incisors are well defined; the suture between them shows the lack of bonds of union. The alveolar processes belonging to the canine teeth are well marked, and to a lesser degree the processes belonging to the other teeth.

Fig. 5 is a palatal view of the same skull. It shows the lateral incisors almost posterior to the centrals, and in the skull their alveolar processes are seen to distinctly surround the teeth.

Fig. 6 is from a skull that has two misplaced second premolars. Their alveolar processes are well shown surrounding the roots of the



teeth. It is from this skull (see Fig. 11) that the X-ray apparently indicates the median palatal suture slightly open throughout its length; also the palato-maxillary sutures.

Fig. 7 is made from an anterior view of the same skull, shown in Fig. 2. It shows the interpremaxillary suture quite open, more than

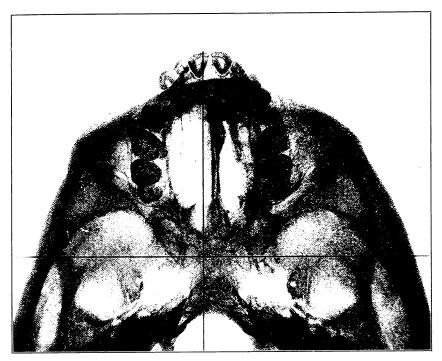


Fig. 12.

likely without the use of any mechanical appliances. The two premaxillary bones are not held firmly in position at this time of life. The fibres of union passing from either of the premaxillæ to the true maxilla are very slight, and on the external surface only.

Fig. 8 is made from an X-ray picture of the same skull, as Figs. 2 and 7. This shows the interpremaxillary suture quite open. It is somewhat similar to those shown by Dr. Barnes and others, but in this case there is no evidence that mechanical force has been used to open the suture.

Fig. 9 is taken from an X-ray of an aged skull, showing that the interpremaxillary suture has never closed.

Jan,



Fig. 10 is somewhat similar to Fig. 9. The skull has a fairly wide arch and an open interpremaxillary suture, which, however, did not prevent the impaction of a canine tooth. Many skulls with wide arches have impacted teeth.

Fig. 11 is similar to Figs. 9 and 10. It shows a wide dental arch with two impacted first premolars. The X-ray picture shows that there is a space between the premaxillary bones and also between the true maxillæ. It also indicates the position of the sutures between the hori-

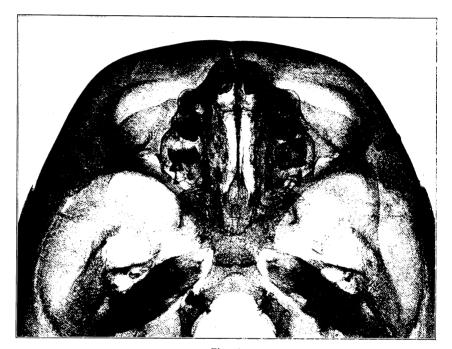


Fig. 13.

zontal plates of the palate bones and the true maxillæ. These sutures appear to be open in radiographs, because the connective tissue within the sutures is not fully calcified and does not sieve out the X-ravs.

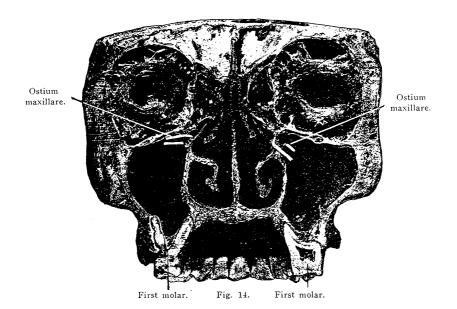
Fig. 12 is made from an X-ray picture of an adult showing a very slight shadow of the roof of the mouth with the portion of the median palatal suture apparently open. Some writers claim in similar pictures that the dark lines shown on each side are the walls of the sutures, whereas, as a matter of fact, they are the shadows of the two plates of the vomer. The darkened shadows that appear in the roof of the mouth are caused largely by the turbinated bones.



Fig. 13 is made from an X-ray picture of a child's skull at about the time of birth. It shows a slight opening along part of the median suture. In the centre there is a dark line indicating the vomer; laterally from the vomer, there appears to be an open space within the nose between the septum and the turbinate bones.

Relation Between Width of Arch and Width of Nares.

Orthodontists and rhinologists generally are under the impression that where there is a narrow dental or palatal arch there will be a correspondingly narrow nasal floor. This is given as one of the reasons for widening the dental arch. Examination of



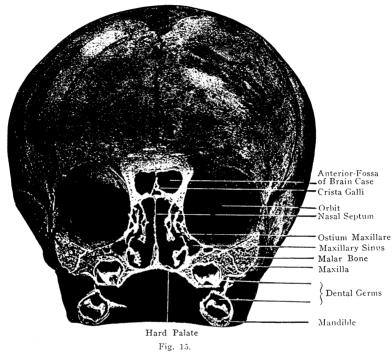
many skulls does not confirm this premise. There are many skulls that have wide palatal arches accompanied by narrow nasal floors. So also are there many skulls in which the arch is narrow and the floor of the nose is wide—one condition apparently accompanying the other.

A few specimens are here shown in which the measurement of the upper dental arch has been taken between the outer surfaces of the first molar teeth, and the width of the floor of the nose measured at a corresponding point in the same plane. The first two specimens are from what I would term typical skulls, without any marked irregularities. In both of these skulls the width of the floor of the nose is about one-half that of the dental arch measured between the points mentioned above.

29 Jan,



Fig. 14 is a vertical transverse bilateral section of a typical skull showing good symmetrical arrangement. The arch is all that could be desired by the orthodontist, while the nasal chamber would be accepted as normal by the most fastidious rhinologist. If all mouths and nasal chambers were like this, the orthodontist and the rhinologist would have little to do except in the case of accident. The dental arch between the



outer sides of the first molar teeth measured 58 mm., while the width of the nasal chamber is about half of this, or 29 mm. I find in other typical skulls about the same relative measurements, i. e., the width of the arch about twice that of the floor of the nose. It must be remembered that these skulls were measured in their dry condition.

Fig. 15 is made from the skull of a child at birth, and shows the same relative measurements.

Fig. 16 shows an arch 70 mm. in width, while the floor of the nose, which should measure 35 mm., is only 26 mm. wide.

Fig. 17 is made from a skull with a very narrow dental arch and a very wide floor of the nose. The dental arch measures 55 mm. between the outer sides of the molar teeth. The floor of the nose, which should be 27.5 mm., is 35 mm.



Fig. 18 is made from a skull with a very wide arch and a narrow compressed nose. The outside measurement of the arch is 66 mm. The nose should be 35 mm., but is only 20 mm. It will be noticed that the maxillary sinuses are very large, which is usually the case where the nose is so narrow. When the nose is wide the antra are often small, or may even be undeveloped.



Fig. 16.

Fig. 19 is made from another wide arch and a narrow nose. This skull has five distinct nasal meati.

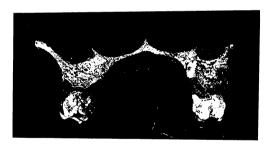


Fig. 17.

Fig. 20 is made from a skull showing one of the narrowest arches in my collection. The width of the arch across the outside of the second premolars is but 44 mm., while the floor of the nose measures 35 mm., one of the widest I have at this point of measurement.

Fig. 21 is from a transverse section of a skull just in front of the first molar teeth, looking forward. The arch is of good width, though narrow at the top, the measurement over the premolars being 55 mm. The floor of the nose measures about 20 mm., and the widest portion of the nose is 32 mm. There are unusually large maxillary sinuses, with a



correspondingly narrow nasal chamber. Before the sinuses were cut, each held one fluid ounce and a quarter (about 35 c.c., or together, 70 c.c.). These are the largest antra I have measured or seen. At the point of the section the two antra are but 10 mm. apart, as they virtually pass under the nasal fossa. In the region of the first premolar teeth, the distance

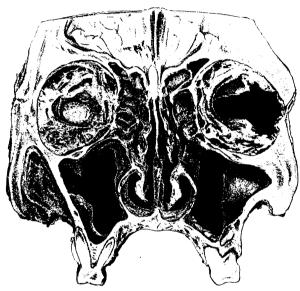


Fig. 18.

between the two antra is about 13 mm. If this man had been unable to breathe through his nose, I think the orthodontist would have found it very difficult to open the intermaxillary suture and widen the nose by applying force to the teeth.

> The following figures illustrate the nose and mouth as respiratory passages.

The Pose and Mouth as

Fig. 22 is from a vertical transverse bliateral Respiratory Passages. section of a frozen head, cut in the region of the first molar teeth. It gives a good view of the nasal

chamber and a cross section of the mouth. The head is fairly symmetrical and shows typical anatomy, the only irregularity being a slight spur on the nasal septum. The nasal chamber is, perhaps, a little narrow, but it is clear and gives plenty of space for respiration. There are very few



skulls that do not have sufficient space over the intermaxillary suture for ordinary respiration. It will be noticed that the tongue does not "lie in the bottom of the mouth," as described in Gray's Anatomy, but, as in all normal cases, fills the mouth when the latter is closed, with the exception of a small space under the hard palate. Professor Donder has spoken of this space between the roof of the mouth and the tongue as acting somewhat on the same principle as the vacuum chamber in an upper artificial denture.

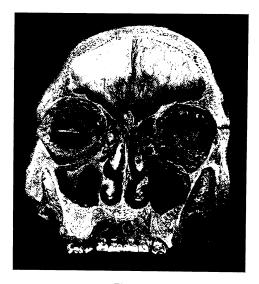


Fig. 19.

When the mouth is open the tongue may be said to lie on the floor, so that there is plenty of space for the air to pass back to the glottis. If the mouth be narrow, the tongue does not have the space it requires, and is forced backward against the soft palate, the soft palate being in turn forced backward and upward against the post-pharyngeal wall, closing the naso-pharynx and the fossa of Rosenmüller. The free nasal and oral respiration brought about in these cases by widening the arches is due to the fact that the tongue is given room to come forward, allowing the soft palate to resume its normal position.

It is natural to suppose that the tongue, being so large and strong, would, through its outward pressure, have more or less influence in moulding the shape of the alveolar arches, but from examinations of many vertical bilateral sections of the face, I am inclined to believe that the



walls of the mouth have more influence in shaping the tongue than the tongue has in shaping the mouth. If a well-developed mouth with a full denture be examined, it will be seen that the surface of the tongue is smooth and conforms to the contour of the teeth, the alveolar process, and the roof of the mouth. On the other hand, in a compressed face, with a narrow arch, the tongue will be irregular in its outline.

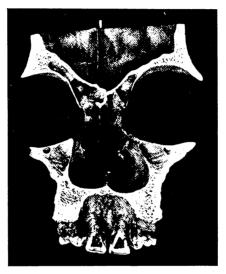


Fig. 20.

Fig. 23 is from a sagittal section of a fresh-frozen skull, which gives a true idea of the lateral portion of the nasal chamber, the hard and soft palates, the pharynx, the mouth, the tongue, and the epiglottis, showing their relations to one another. It will be noticed that the central incisor teeth are in good occlusion. The mouth is nearly filled by the tongue, leaving but little space under the arch of the palate. The tongue also extends well back into the oro-pharynx, coming in contact with the soft palate, which is carried backward against the post-pharyngeal wall. The epiglottis at the base of the tongue also rests slightly against the back of the pharynx, leaving but little space for respiration. This space is sufficient when the individual is at rest. During exertion, however, more breathing space is required; the mouth is opened and the space in the pharyngeal region is increased. There is no congestion shown in the nasal chamber; everything is clear, allowing good ventilation and drainage.



If the dental arch of this skull had been narrow, the tongue would have been forced backward against the soft palate and the post-pharyngeal wall, thus cutting off both nasal and oral respiration, and both of these air passages could have been relieved only by opening the mouth and carrying the tongue downward and forward with the mandible. This is what occurs in many cases of so-called "mouth-breathing." Mouth-breathing is not always caused by adenoids or obstruction of the true nasal passages, but often by frozen dental arches.

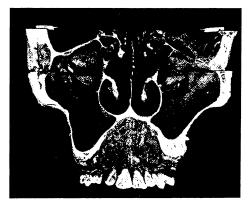


Fig. 21.

Fig. 24 is made from a bilateral section of a frozen head. It shows that the face is narrowed and compressed until the maxillary sinus of one side (the right) is lacking, while the other is but rudimentary, as in early embryonic life. It will be noticed that while the internal structures of the face are very much compressed, the floor of the nose is of fairly good width. The septum is crooked. The arch of the mouth is very narrow in proportion to the floor of the nose. The mandible is also narrowed, consequently the tongue is very much compressed and out of shape and is forced backward into the pharynx, thus cutting off respiration, especially when the mouth is closed.

Fig. 25 is from a vertical transverse section of the same skull as that shown in Fig. 24. This shows a very much compressed condition of the structures surrounding the oro-pharynx. The uvula is twisted, the tonsils, the epiglottis and the larynx are out of shape from pressure of the tongue, produced, not by a narrow floor of the nose, but by a narrow dental arch. It must have been difficult for this man to,



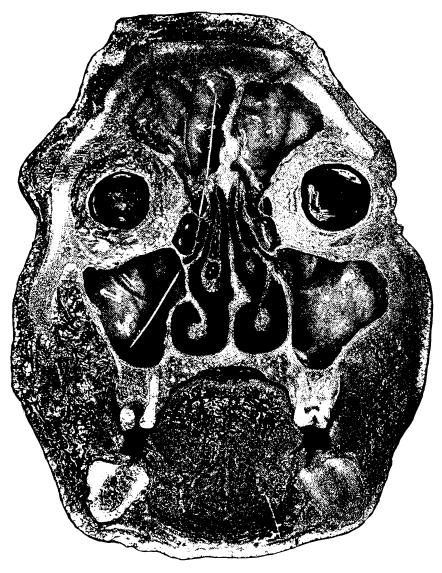


Fig. 22.

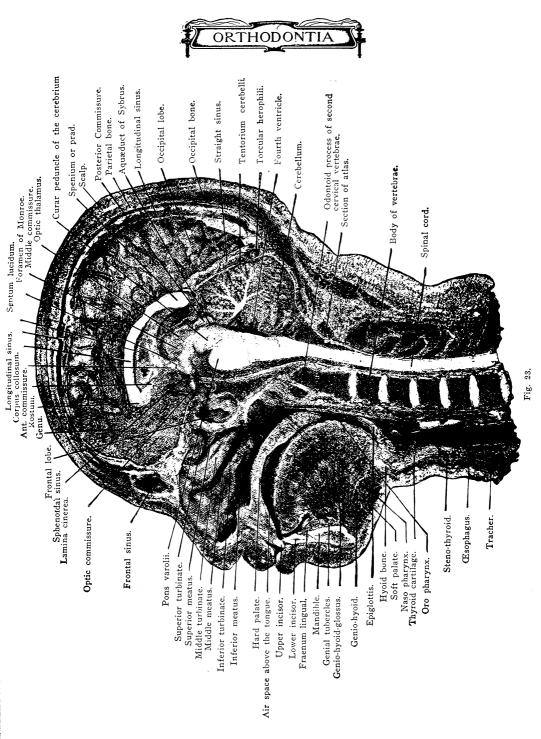
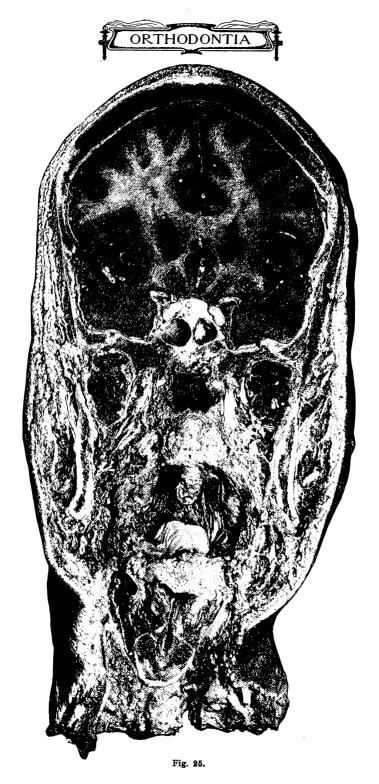


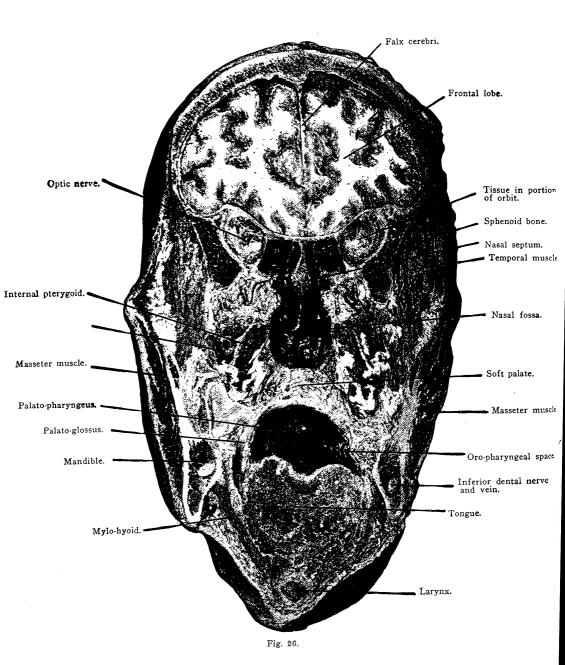




Fig. 24.









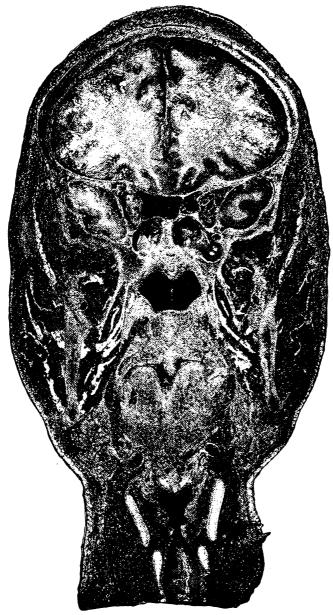


Fig. 27.



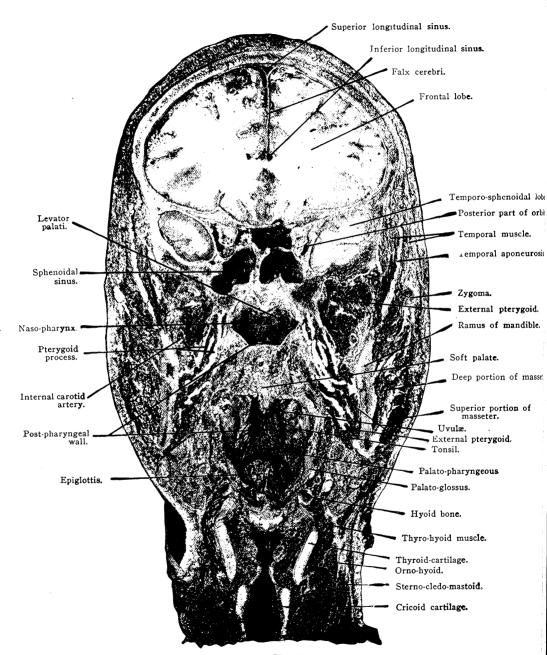
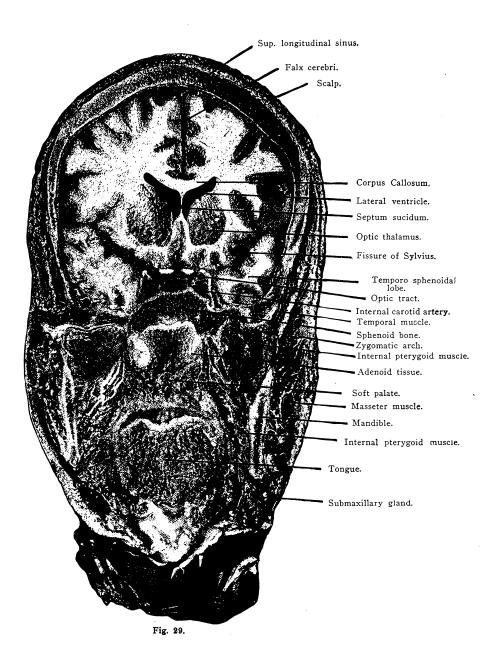


Fig. 28.





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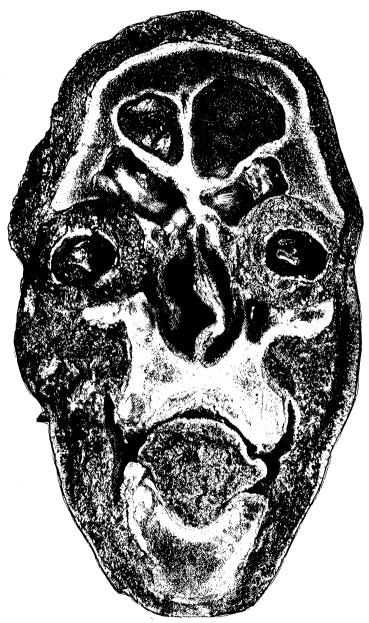


Fig. 30.



carry on free respiration, and impossible for him to perform the deep breathing required by great exertion. This morbid condition brings a further congestion and thickening of the mucous membrane of the nose and its accessory sinuses. If the dental arches be widened in this case, permitting free nasal respiration, drainage and ventilation, the congestion of the soft parts will disappear and there will in this way be greater width to the nose and improved general health, not because the intermaxillary suture is opened (which it is not), but because the tongue is liberated and given room.

Fig. 26 is made from a bilateral vertical section of a frozen head cut in the region of the posterior portion of the hard palate. The subject died with the mouth open, and it had not been closed before the section was made. The anterior portion of the larynx is shown. From near the larynx it will be noticed that the fibres of the mylo-hyoid muscles pass upward and outward to the internal oblique lines of the mandible. If these muscles are kept in a state of tension, the angles of the mandible will be drawn towards each other and thus tend to contract the lower portion of the face. Comparison of this illustration with Fig. 22 will show great differences in regard to these muscles. In this specimen, (Fig. 26) the palato-glossus and palato-pharyngeus muscles are placed on tension, narrowing the distance between the right and left tonsillar spaces. This action of the muscles in this region naturally influences the narrowing of the face, as also does the lack of percussive force of the lower teeth against the upper.

Fig. 27 gives a view of a transverse bilateral section, showing the naso-pharyngeal space free from adenoids. This soft plate, the uvula and the posterior portion of the tongue are in good position. It will be noticed that the tongue and the soft palate are close together. Below the tongue and a little to one side, a cross section of the hyoid bone will be observed, and below this are cross sections of the thyroid and cricoid cartilages, showing the inlet of the larynx and trachea. If the posterior portion of the tongue be removed, the tonsillar space will be brought in view, as shown in Fig. 28. In this illustration the uvula will be seen in the centre, with the post-pharyngeal wall immediately below it. On each side of the uvula are the tonsils. At the bottom of this space the anterior portion of the epiglottis is seen. Its general shape deflects the passage of fluids from the mouth to the sides of the pharynx. Everything indicates ample space for both nasal and oral respiration.

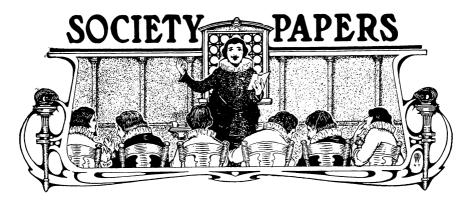
Fig. 29 is from a vertical transverse bilateral section of a frozen skull made in the region of the anterior portion of the soft palate. The passageway of the posterior nares is nearly closed. The post-pharyngeal wall is partly seen above the soft palate, and the uvula is shown. It is



very evident that when the adenoids are present, as shown in the picture, nasal respiration would be very difficult. Of course there is a cause for these adenoids, and I am inclined to think that narrow dental arches will be found to be responsible in the majority of the cases. Adenoids induce mouth-breathing, and if the mouth is kept open there is a tendency to compress the arches. If we look at Fig. 30, taken from the same skull as Fig. 29, only more anteriorly, we find the dental arches very narrow, the mouth partly opened with the tongue compressed, seeking room even out toward the cheeks. It also shows a deflected septum. Here is a marked case of the "vicious circle," difficult respiration through the posterior nares causing the mouth to be kept open, which produces a narrowing of the arches, the narrow arches in turn force the tongue back against the soft palate, which still further shuts off nasal respiration, drainage and ventilation, causing again abnormal mouth-breathing.

I would like to say again in conclusion, that it is most important that abnormally narrow dental arches should be carried out to a normal width. Whether one thinks that the intermaxillary suture is opened in so doing, or whether one believes that it is not, makes little difference. The main point is that the narrow arches should be widened and the tongue allowed to come forward, which will relieve the obstruction of the pharynx, permit freer respiration, drainage and ventilation, and also relieve the congested condition of the erectile tissue and mucous membrane of the nose, accessory sinuses, and ducts. This will in turn assist in giving breathing space, improve olfaction, and in some cases give better hearing, thus breaking up the vicious circle produced by narrow dental arches.





Difficult Problems in Operative and Prosthetic Dentistry Solved by Casting.

By W. D. N. Moore, L.D.S., D.D.S., Chicago. Read before the Second District Dental Society, Brooklyn, N. Y., October, 1912.

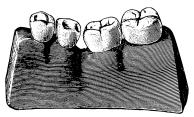
As we look back over the practice of dentistry, if only for a few years, we must be impressed with the many changes in methods employed in the effort to find something better than what had been previously used. Many times these changes have been for good and many times for ill; but, nevertheless, to the close observer, a good lesson has been taught and development has resulted, until to-day many of the difficult problems that heretofore had fairly baffled the skill of dentists are now made successful by the casting method.

Like the advent of many a new practice in a profession, casting of gold or other metals for dental purposes has been received by so many with such enthusiasm, thinking it would solve impossibilities, and it has been so often indiscriminately employed that a proper balance is essential, and to obtain the best results sound judgment and a thorough knowledge of indications are most important. It has been of more than ordinary interest in the last few years to note, in dental meetings and in dental literature, the time and space devoted to heated discussions regarding the use of the casting principle in comparison to other methods longer employed and thought successful. It is useless to attempt the practice of dentistry, a slave to any one method, and in order to obtain the best results, it is necessary to have a keen perception of the requirements of each particular case and treat it from that standpoint alone. To say that all decayed teeth should be filled with inlay fillings, or that all cavities in teeth should be filled with gold foil, would be an irrational statement, and the practice of such principles would fall far short of



success. Good judgment is the best guardian in these matters, and without it, troubles would be too frequent to be in the least encouraging.

In operative dentistry, there are many of the smaller and simpler cavities that could be filled in two or more ways, each of which would be equally successful, and it is not the object of this essay to deal with such cases, but rather with those wherein ordinary methods have in a measure failed to fulfill all requirements, and with others more difficult to successfully control.



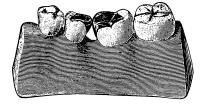


FIG. I.

FIG. 2.

Exaggerated Contacts to Protect Gingiva. There is probably no more common failure associated with the filling of teeth than the lack of the proper protection of the gum septum, due to faulty contour of the filling with consequently no contact with adjacent teeth, or if any, badly formed

or placed. By means of the cast inlay, all the requirements in this particular can be made ideal and as perfect results may be gained as could be desired.

In this connection, too, there are many trying cases where a tooth, often the first permanent molar, and sometimes more than one, has been lost. The space left has in time lessened in width and a tipping of the remaining teeth has occurred to the extent that an artificial tooth could not be admitted in the way of bridgework, and yet the space is so great (Fig. 1) as to interfere, not only with mastication in this part of the mouth, but if allowed to remain long is a serious disaster to the whole arch. Only large contour inlays in the proximal and occlusal surfaces of the teeth adjacent to such a space made to produce tight contact and restore occlusion can correct such a condition and restore to usefulness and comfort that part of the mouth that has been disabled, with surrounding tissues frequently impaired (Fig. 2). The tipping of remaining teeth in these cases of extraction has been so great that pain has resulted



upon contact with opposing teeth, and unless supported by inlays assembled before cementing, relief could not be given the patient. No other procedure in operative dentistry could possibly afford the same benefit to the patient as that offered by casting.

Inlays for Extensive Cavities.

It is doubtful if casting has done more service in dentistry, or is more ideal in its indication than in cases of extensive loss of tooth structure, and where before the days of casting the artificial crown was so commonly used. I know of no practice so

discouraging to the conscientious dentist, nor more unsatisfactory to the patient, than the untimely use of the artificial crown for the restoration



of a tooth to usefulness, while there may be still sufficient tooth structure left whereby an inlay could serve instead of a crown, and irritation to gum tissue be thus avoided. It is doubtful whether any one practice has done more harm in the human mouth than that of crowning teeth that otherwise could have been saved and made useful for years by well-made cast fillings. The artificial crown has been so grossly used that we well might blush to realize the extent of injury inflicted upon the gum tissue in view of the fact that a cast filling could have been used with so much less sacrifice on the part of the patient. It is wonderful with what success a badly broken-down bicuspid or molar can be restored to long service by means of casting. Given but one remaining surface on either of these teeth and the other four surfaces can be successfully constructed to withstand many years of hard stress of mastication (Fig. 3) with no such danger as with a crown.

Sectional Inlays. There are cases very similar to this in which decay has been so extensive and has resulted in such irregular and indefinitely shaped cavities that only a plastic filling material would seem possible. Among

these are to be found on bicuspids and molars, cavities where the decay has not only involved the proximal and occlusal surfaces, but has extended well around into the buccal or lingual surface in the region of the gum line. This forms a cavity at the gingival part of the tooth



much greater in width than on the proximal surface, and it has been claimed that only amalgam or a cement filling could be used. is a mistake, for a cast inlay can be successfully used in these cases by making the inlay in two sections and without any complication secure a permanent piece of work. The inlay must be made in two pieces because the wax fitted to such a cavity could not be removed without breakage or distortion. The procedure is as follows: First fill that part of the cavity at the bucco-gingival angle with wax to a point that would make the remainder of the cavity of the proper shape for the or-Trim to definite margins, remove and cast (Fig. 4, a). Cement this casting in place and polish. Then fit wax to remainder of cavity and cast and cement in ordinary way (Fig. 4, b and c). Careful technique and accuracy throughout will give a result that is most encouraging to the operator and a strong impulse to surrender less cavities of this kind to plastic fillings, or to the unwelcome reception of an artificial crown. I care not how irregular a cavity may be in its shape if there be even a reasonable part of one surface of a tooth remaining, a filling can be cast that will render that tooth serviceable for many years. Once determined to avoid the use of crowns, except where esthetic requirements would demand a porcelain crown, it is really astonishing how few teeth will need to be crowned, in comparison with what were sacrificed before the days of casting. It may be said here that such large castings are practically crowns, and this may be more or less true; yet the injury to the soft tissues is so much less that the casting is decidely preferable and the complete crowning of teeth, to the extent practiced in the past, should be emphatically discouraged.

It is not uncommon to meet cases in practice in which strong muscles of mastication, or certain habits or characteristics of the patients, or a combination of all of these, together with, it may be the loss of a few teeth, has caused abrasion and wearing down of the teeth in the mouth to such an extent that a small portion of the natural crown remains and in some instances total loss of natural crowns has occurred. These are probably the most difficult and extensive cases with which a dentist has to deal. It must be remembered that these cases present in varied stages of tooth destruction and the method of restoration depends very much upon the extent of the tooth structure remaining. To correct this condition, it is almost useless to treat a few teeth, but it must be regarded from a broader viewpoint and practically every tooth in the mouth should be restored to its original form and the two arches again made as nearly as possible what they were before this wearing-down process started. It means reconstruction to nature's form and again placing the two masticating arches at their proper distance apart. Those



who have undertaken cases of this kind, and who have successfully completed them, know well the task it is; but hard work, good judgment and careful technique will assure a result most gratifying to patient and operator. Such restoration can be satisactorily accomplished only by casting, and it is particularly in these extensive cases that we must contribute most heartily no small share of gratitude for the possibilities afforded us by the casting process. To restore a large number of posterior teeth worn as above described, as would necessarily have to be done in such ex-



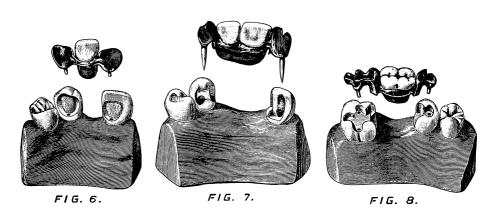
tensive abrasion, by any other method than cast inlays would be a fruitless effort. Such cases can be readily improved by building up the crowns of the posterior teeth to their original length and inlaying with porcelain or crowning with porcelain crowns, the anterior teeth, as the extent of abrasion would indicate.

The stress that would wear down tooth enamel to the extent so often seen would find pure gold and even 22 karat gold too easily worn to endure long. It is better to use a metal of considerable resistance, such as pure gold alloyed with platinum to the extent of ten to fifteen per cent. But no metal, or combination of metals, casts more accurately than pure gold will cast. Ideal results can be had by casting that part of inlay in contact with the tooth in pure gold, thus securing best adaptation. The remainder of the inlay and that part to be subjected to the wear from the opposing teeth, should be cast in a metal offering a hard surface, such as a combination of platinum and gold possesses. If there is any doubt as to the attachment of the second casting to the first one, the two can be easily soldered. In this manner the requirements for adaptation and resistance are well met. Fig. 5 shows the complete M. O. D. restoration of a molar.

It is a source of much regret that we find in the permanent teeth of young patients so many fillings of a temporary kind, and the common plea made that these teeth should not be filled with gold, or that the nervous systems of these patients are unable to withstand the operation required for filling with gold foil, have been made as ex-



cuses for many poor fillings, but I fail to see how there can be any justification of such practice in these days. If there is any tooth or any patient that is entitled to the best that dentistry can offer, it is that newly erupted tooth in the young patient. It was the little break that preceded the mighty flood, and so should be regarded the cavities of little patients seeking our services. The best we can do for the child is none too good, and it is to be deplored that so much of the ordinary is so



common. Were it otherwise, our tasks later on would be less, our patients better served and our profession more worthy. Casting has made it possible to fill these cavities with the minimum of strain on patient and with results that so excel temporary work that comparison is absurd. The fact that short sittings can be made, with very little, if any, additional pain in cavity preparations, over that associated with temporary work, places the cast filling in the foremost rank as a filling material for these young patients. Besides, these boys and girls can be brought up to have a higher appreciation of dental operations, when relieved of the experience of frequently having teeth refilled in order to save them. The idea of permanency is a good thing and can be best impressed when things of the temporary nature are kept from the mind.

Easting Process in Prosthodontia.

In the field of prosthodontia, casting has wrought equally marked changes in practice. Its possibilities cannot be fully realized and are unlimited. Only a few years ago, crown and bridgework

was one great collection of many ideas and methods, sufficient to bewilder the old practitioner or young beginner. The crowns and bridges worn by patients in general, while more or less useful, were far from being all to be desired from an esthetic standpoint. The involuntary display



of distasteful and unsightly discolored porcelain facings and large gold occlusal surfaces roughly constructed, was not the most pleasing sight to the critical eye. Casting has made it possible to avoid this without any sacrifice in strength. Perfect adaptation between end of root and the detachable porcelain facing can be obtained with minimum irritation to gum tissue, making a crown of much strength and natural appearance.



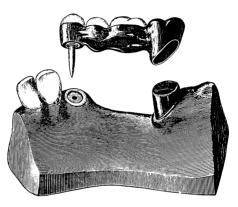


FIG. 9.

FIG. 10.

Tnlay Abutments

The same is applicable to bridgework, and the artistic feature can be more fully realized. The abutments for bridges before the days of casting usually caused a mutilation of natural teeth to per-

mit of the use of a crown, which was not always justifiable. This same purpose can now be accomplished by the use of the cast inlay, resulting in less mutilation of tooth structure (Figs. 6, 7, and 8). Often it is necessary to supplement for strength one abutment in a long bridge, and this can be most admirably accomplished by the use of a cast inlay in the adjacent tooth (Fig. 9). The dummies can be constructed on the same principle as single crowns or abutments, using the detachable porcelain facing, thus avoiding the display of gold. By casting, the metal work supporting the facings can be so shaped as to make much for comfort to the patient and hygienic conditions in the mouth.

In the event of fracture of a facing on a cast base crown or bridge, a duplicate can be had from records made of the mold and color of the previous facing used, making a repair easy for dentist with little inconvenience to patient. In many instances, the conditions may not per-



mit of sufficient amount of porcelain to warrant, according to best judgment, the use of porcelain facings, and here cosmetics must be sacrificed for strength, and it may be this reason that has allowed so many bridges to be constructed with such an abundance of gold. Though there are exceptions to all rules, yet casting offers the opportunity of combining all the requirements—strength, adaptation and cosmetics to the very highest degree, and its application may be made to displace many of our former methods.

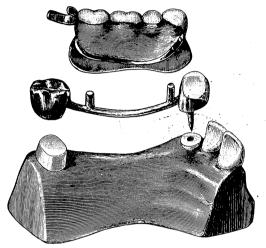


FIG. 11.

In the construction of artificial dentures the casting process cannot yet be regarded with universal certainty. It does, however, offer many advantages in the construction of partial dentures, bars, connecting saddles, splints for loosened teeth and supports for small removable pieces of work. In such cases as these, the best of adaptation can be gained and by the use of the proper combination of metal a rigidity and strength can be secured with less time and energy than is required by the older method of swedging. It permits of the use of detachable facings in connection with these cases which is stronger, more artistic and more cleanly than attachments of vulcanite.

To consider the technique implied in these particular cases would involve too much of your time, and I fear would inflict too much upon your patience. Examples, shown in Figs. 10 and 11, show varied possibilities. It is, however, a most important part of casting, and, to be dealt with fully, would be ample for an essay in itself. The belief has been too prevalent, for the good of casting, that this process was such



that indifferent technique little interfered with best results. But in this as in many other things, there is no "royal road," and close application to every detail must be observed if the best is to be obtained.

In all these claims that your essayist has made for the casting process in the solution of difficult problems, it must be remembered that the process alone will not do all. The question of personal equation has a powerful influence upon results. The individual with the enthusiasm and perseverance, not relying entirely upon the process, is the one who is most familiar with the possibilities of casting, as applied to dentistry. Judgment, ingenuity and accurate technique are important factors in this work, and to disregard any one of these would be unwise. The varied results obtained are an evidence of this fact, and it may be due to expecting too much of the process and not enough of ourselves. However, the casting process has afforded us an opportunity for overcoming many difficulties and of raising the standards in a measure that should be a healthy stimulus to the practice of dentistry.

The Extraction of Ceeth and Post-Operative Creatment; with Special Reference to Irregular and Impacted Conditions.

By James F. Hasbrouck, D.D.S., M.D., New York City.

Read before the Union Meeting of the Third and Fourth District Dental Societies,

at Troy, N. Y., October 22, 1912.

In order to operate successfully for the extraction of teeth it is necessary that one should have a more or less intimate knowledge of the anatomy of the face and neck, particularly of the maxillæ with their muscular attachments, nerve and blood supply, the tongue and soft tissues in the floor of the mouth, their normal position, and the relations they bear toward one another.

Diagnosis. The first and most important step in the operation for extraction is that of diagnosis. Observe the patient carefully, making an effort to classify him as to physical type—whether of bilious, sanguineous, or phlegmatic, or whatever the type may be, by this means forming an opinion as to the probable formation and depth of the roots of the teeth: make a careful examination of the bone and alveolar process—note width and depth, also estimate its density—for as you know, we meet with many types of bone and process, from the dense structure almost as hard as ivory, to the soft and spongy material which can be broken down with the forceps, or other cutting instrument with the utmost ease.



In studying the process you will note that I have mentioned two principal types. For our purpose I think we may divide each type into two distinct classes: Class I, being the short, broad formation, where the process is well developed at the neck of the tooth, jutting out sharply and forming a distinct shoulder at this point, and from here running down to the bone, broadening rapidly throughout its entire extent: it is this class of process which we will discuss later on, for it is a formation which probably gives rise to as many difficulties as any one condition with which we have to deal.

Then we have Class II—deep and narrow process—the attachment of which below the gingival margin can hardly be detected, except with the finest instruments, and from its point of attachment broadening very gradually as it merges into the bone. This class of process of either the hard or soft type is ideal from the surgical standpoint, being easily handled in all bone-cutting operations.

Next in order we must consider the soft parts and their relation to the field of operation; the development and rigidity of the buccal muscles, whether or not in opening the mouth the field of operation will be obscured or interfered with. Observe the size of the tongue and its position in the floor of the mouth and its relation to the soft structures beneath.

Then note carefully the general condition and position of the teeth in the mouth, bridges, crowns, etc., and the probability of their being injured during the operation; with the extent of the damage that might be done, if any.

Lastly, observe the tooth to be operated upon; the appearance and condition of its crown, extent of decay, the probable direction and condition of its roots, our estimate of the condition of the roots being based upon the history given, duration of treatment, if any, plus other known pathological influences. Note whether the tooth is wedged or twisted in its socket; whether in an abnormal position, unerupted, or impacted, and prepare for operation accordingly.

Since the perfection of radiography there is no reason why any suspected irregularity of the roots should be ignored without a positive diagnosis being made by this means, and in many cases I should consider a radiograph absolutely esential; but it is obvious that every case for tooth extraction cannot or will not be X-rayed, so we are compelled to make the diagnosis of root conditions by other means.

In the extraction of teeth care should be taken at all times in order to avoid as much as possible unnecessary laceration of the gums and adjacent soft tissues, or undue breaking down of the process. In many cases this cannot be avoided, and in these cases in which laceration is in-



evitable I would advise making the necessary incisions with a sharp scissors or lance before using the forceps, cutting freely and fearlessly wherever required. When this method is pursued and proper precautions have been taken and treatment follows afterwards, the result is good.

Position of Operator when Extracting.

Now, as to the proper position for skilful extraction, both of patient and operator. Your patient should be seated in a solid chair with side arms, in a slightly reclining position with the head thrown back against a suitable head-rest. The angle at which the

body and head must lie will vary somewhat according to the case. For the extraction of the lower and the six upper front teeth, the seat of the chair should be well down; for the remaining teeth the chair should be eievated.

The position of the operator should be at the right side of and a little behind the patient; the left arm around the head with the hand supporting the jaw and in a position to be of use as a screen or an aid to introducing instruments, or in keeping the tongue or cheeks out of the way.

This position may be maintained for the extraction of a complete denture, provided that suitable instruments are used. Never stand in front of your patient while operating; you not only shut off your light, but you lose control of the head, which control is the keystone to all successful and perfect operations of this nature, particularly under an anæsthetic.

The use of instruments I shall not go into particularly; some men work better with one type, some with another. I will merely express the opinion that I do not think that continuous and successful work can be done with other than the so-called bayonet beaked forceps, which should have a concave surface on the grasping side, a rounded point and a sharp scissors-like edge all the way round. This type of instrument will not slip and bad lacerations are seldom made, because the sharp edge will cut its way cleanly and smoothly through gum or process whenever necessary.

In operating, do not try to do too much at one time. Never hurry beyond a reasonable limit. Be as quick as you can, but be deliberate enough to do your work thoroughly. It is generally better to complete the extraction of one tooth before passing to another. In other words, it is much better to get one tooth entirely out than to break off two or three. The extent of your operation should be governed mainly by the physical condition of your patient. In most cases any amount of extracting may be done, but sometimes, for various reasons, it is preferable



to operate on one side of the mouth only, this to be followed by a subsequent operation on the other side at a later date.

I judge that most of you are familiar with the three stages into which we divide the act of tooth extraction, namely, "First, grasping the tooth; second, loosening and breaking up its attachments and finally the act of removal from the socket."

("Extraction of Teeth," by Thomas L. Stellwagen, in "American System of Dentistry." The writer has borrowed several quotations from this essay—it being one of the best on this subject which has come to his notice.)

Grasping the Cooth.

"In grasping the tooth the beaks of the forceps should be forced as far up on the neck of the tooth as possible—care being used to pass beneath the edge of the gum." In the type of mouth which has a

loose, spongy gum this may be accomplished with ease, but in the mouth which has a firm gum tightly stretched over the process it will not be easy to force the beaks far below the gingival margin without more or less laceration. "Sometimes a slight rotary motion will greatly facilitate this part of the operation, the beaks seeming to bore their way."

Loosening the Cooth.

"To loosen the tooth, we begin to rock with an out-and-in motion—with gradually increasing force—continually feeling for the direction in which there seems to be the least resistance (which in the upper

jaw is generally outward, while in the lower jaw in many cases it is inward), and apply the most of our force in that direction.

If the in-and-out motion does not show results, a rotation back and forth may be combined with it. This double motion is particularly effective in the loosening of lower third molars, and on the six lower and upper front teeth; alternating these two movements will show very satisfactory results.

Removal of the Cooth.

"After the tooth has been well loosened it is time to begin its removal and traction should be gradually applied to draw it from its socket, feeling carefully for the direction in which it most yields.

and avoiding the exertion of so much force that in the sudden release of the tooth one's movement could not be controlled." Always observe carefully what you are doing, and never work when your field of operation becomes obscured. If blood or pus flows too freely it may be removed with gauze swabs.

In the operation for extraction it is always best to make sure that the whole of the tooth is removed. Notice every particle which comes from the patient's mouth and account for the tip of each and every root.



I say the whole of the tooth should be removed; while cases are rare when any portion of a tooth may be allowed to remain, there are exceptions in which a point of a root breaking off and no pathological condition being present, this tip may be left in for a time, since the operation for its removal might cause undue laceration and soreness, and nature, which is very kind in most of these cases, will in time bring the broken piece so close to the surface of the gum that it can be removed at a subsequent operation without discomfort.

"It would be well to remember that the roots of all teeth as a rule incline backward or away from the median line. The wisdom teeth in particular have an outward as well as a backward curve of the roots, and this double curve must be borne in mind in all operations on them in which the roots are involved. The hooks formed by these curves make it impossible to remove teeth so crooked without following the curved line of the axis of the root." To attempt to remove such teeth in any other way by means of the forceps would entail fracture either of the bone or teeth—the latter of which may be easily done. You will thus observe that a peculiar application of force is necessary in extracting—namely, along the line of least resistance, which would be that of the long or vertical axis of the root.

Exostosis
a Complication
in Extraction.

Probably the most difficult teeth to extract in a normal denture are the first or sixth-year molars; particularly those of the lower jaw. The roots are always well developed with more or less spread to them, and being teeth of great importance they are in

many mouths subjected to considerable treatment; and I think that we have had demonstration over and over again that the long-continued treatment or irritation of the root of a tooth will frequently be the cause of considerable enlargement of the root. When this condition exists on the roots of a first molar, we are confronted with a most difficult proposition. If the roots are widely divergent, there will probably be a fracture at the neck of the tooth shortly after traction is applied, which, under the circumstances, is about the best thing which could happen, as each root can then be extracted separately along the line of its own axis and the operation accomplished without much disturbance of surrounding parts.

But how about this bulbous end of the root? Here is a difficulty for handling which no fixed rule can be laid down. In the first place, I would advise going down with your forceps outside of the process and under the gum; in other words, sliding the beaks of your instrument down between gum and process and in this way stripping the soft tissue away from the bone. Having calculated the depth to which one may go with



safety, and having reached this point, the forceps should be tightly closed so as to cut through the process completely, and so that you can feel that the root is in your grasp; then apply the usual rules for extraction. Should the root fracture again at this point, the operation can be completed only by the use of the chisel or surgical engine and bone burr.

Use of Elevators for Fractured Roots.

In the case of a multiple rooted tooth, when one root is completely extracted and another root or roots are broken off too low down to be safely grasped with the forceps, the extraction may sometimes be completed by using one of the various elevators. By

so placing the elevator that the bone will act as a fulcrum, with the edge of the elevator against the root to be extracted, and by a proper manipulation of this instrument so that the force will be applied to the root along the proper line, the extraction may be accomplished. To use the elevator properly, the handle should rest in the palm of the hand with the index finger extending along the shank of the instrument, and the operation should be performed by a manipulation of the instrument in such a way that if the elevator were not there you would have performed the operation with the tip of the index finger. By placing the elevator in an empty root socket, and applying force, as above stated, this method will remove the broken roots adjoining, together with the septum between, which does no harm at all, and under some conditions is very much to be desired.

Extraction of Guspids.

Next to the first molars the most difficult teeth to extract are probably the cuspids, which, owing to the extreme width of root and its length, together with the formation of the jaw at this point, makes

a fracture of either tooth or process, or both, most likely whenever too much force is applied. The method advised for the extraction of these teeth is a combination of the in-and-out motion with a decided rotation back and forth, which, if persistently applied, the tooth having been grasped high enough above the gingival margin in the first place, will probably result in its extraction.

Extraction of Bicuspids.

After the cuspids it will very likely be the lower bicuspids that we will have the most trouble with, and here we must leave the normal and deal with a pathological condition. The extraction of a normal bi-

cuspid is not a difficult operation, but when, through disease or other cause, the root has become enlarged or irregular, we will be face to face with as difficult an operation in extraction as there is. And, strange to say, of all the teeth we have to extract we will probably find exostosis present in the lower bicuspids in the proportion of five to one.



The method we must pursue in the extraction of the lower bicuspids is this: After having grasped the tooth as far down below the neck as possible, the forceps should be tightly closed, then starting with the usual out-and-in motion, traction should be applied. If this should not show results a fresh grasp of the tooth should be made lower down, if possible, always bearing in mind the danger of injury to the vessels coming from the mental foramen, or of fracture of the bone, if we go too low. Having secured a fresh grasp, close the forceps so as to cut through the intervening process, as described in the extraction of the first molar roots. Then, being quite sure that the process is cut, rotate strongly, at the same time applying traction. If the force be applied carefully and persistently—I wish you to note my use of the word persistently, for there is probably no other operation where patience and perseverance can be used to so great advantage as in tooth extraction—the root will probably be removed.

Unerupted Ceeth.

Just a word at this point about unerupted teeth. The fact that a tooth may be covered with the gum does not necessarily mean that the tooth is impacted, or that its removal is particularly difficult. If a

proper diagnosis is made, and this should be done with the aid of the X-ray if necessary, and there is enough of the crown free from the bone to be grasped by the forceps, the extraction can be made by incising and spreading the soft tissues and applying the same technique as would be used under normal conditions.

Now, as to our treatment of special cases, and by this I mean principally the lower third molars, for while we may see many cases of supernumerary teeth in odd places, and many of the other teeth misplaced or impacted, it will be the lower third molars which we will see in a greater variety of abnormal positions than one would suppose it would be possible for a tooth to assume.

Extraction of Lower Chird Molars.

We cannot make a general rule for the extraction of lower third molars, except to call your attention to the backward and outward twist of the roots, which we must look for, and must apply our xis when it can be done, and it cannot always be done

traction along that axis when it can be done, and it cannot always be done Generally speaking, our technique in the extraction of a lower third molar would be as follows:

First, have a clear field for your operation; in other words, see that the crown of the tooth is well exposed, so that it can be firmly grasped with the forceps; it does not matter whether the tooth is outside of the arch, unerupted, or impacted. This suggestion will apply to any case. If necessary, cut away overlying tissue, both hard and soft, in order to

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accomplish this result. The gum may be incised with the scissors and stripped away from the bone with a periosteal elevator, after which any of the bone may be cut away with a burr, or chisel, or Rongeur forceps, as the case may demand. In many instances, when the crown of the third molar is low down in the bone, everything else being normal, by merely running a sharp burr a few times around the tooth we will dispose of the process sufficiently to accomplish our purpose. One must, however, bear in mind continually the anatomy of the parts and their relations when working on the lower third molars, because the cutting away of the bone necessarily weakens the jaw, and there are vessels and nerves adjacent to the parts, injury to which will prove to be unpleasant and in some cases quite serious. The crown of the third molar having been entirely freed, it should be grasped with the forceps and an attempt should be made to break up the attachment of the roots by a combination of the out-and-in motion with rotation. More and more force should be gradually applied up to a certain point, and just what this point should be, only experience and one's sense of touch can teach. Let it suffice however, to say that in all probability the tooth will loosen or break long before one feels that he has reached the danger point. Having loosened the tooth it should then of course be extracted along the axis of the roots, which would be with a backward and inward curve. In many cases it is difficult, almost impossible, to perform this movement with the forceps, and here we must again call our elevator into use. Holding the instrument as already described, the edge should be forced down between the second and third molars, with the concavity toward the third, and using the second molar as a fulcrum, by means of a succession of twists the third molar will be forced upward and backward out of its socket.

Impacted Ceeth.

As to our method of dealing with impacted teeth, the foregoing remarks will apply to them exactly the same as to the others, except that the surgical work usually necessary before the tooth can be removed

leads us somewhat away from the general field of dentistry. More or less special equipment is required, and it would be far wiser for the average practitioner not to meddle with these cases unless he be very sure of his ground.

The secret of the entire operation is proper diagnosis, which should be verified by the use of the radiograph, and I should like just here to speak a word of caution against advising the removal of all impacted third molars, when in many cases the extraction of the second molar will relieve the symptoms, and under certain conditions the third molar may in time come forward and become quite serviceable.



Complications Met in Cooth Extraction.

What complications will we meet in tooth extraction? The most frequent and one which will interfere most with our operation is trismus, or inability of the patient to open the jaws. When this condition exists, a general anæsthetic is always in-

dicated, under which the mouth may be forced open and the usual technique of the operation followed. In case of extreme muscular stiffness or ankylosis, how would we extract the rear teeth? This, I confess, is something of a problem. In many cases, by retracting the cheek strongly, the forceps can be forced back between the cheek muscles and the teeth, until opposite to the tooth to be extracted; then, by placing the outer beak of the forceps in position at the gingival margin, the inner beak may be forced under the occlusal surface of the tooth, acting in this way as a lever to force the jaws apart, and at the same time applying all the force in an outward direction, as would naturally be the case from the position of the forceps. If the inner beak of the forceps can now be forced inside of the arch in this manner, and the tooth grasped on the inside of the crown, the extraction will usually result; and even when the crown cannot be grasped on the inside, a molar or bicuspid can frequently be broken out by this method. I say broken out, because a fracture of the process will invariably result under these conditions.

Other complications I have touched upon already, namely, density of process, divergent or twisted roots, and enlargement of roots, all of which will cause undue resistance in the operation for extraction. An emergency we may have to deal with will be when in seeking a root with the forceps it may be forced into the antrum or abscess cavity. Whenever this accident occurs, one should not hesitate to enlarge the opening with an osteotome to a sufficient size, so that by irrigation the root may be washed out or possibly picked out with the thumb forceps. For irrigation under these conditions I am accustomed to using a moderately warm, normal saline solution in preference to any antiseptic.

Creatment After Extraction.

The after-treatment of extraction is purely surgical. Any laceration of the soft parts should be trimmed smooth, and any areas which might slough should be cut away. All loose particles of process

should be cleared away and any exposed bone should be cut away with the bone forceps and a gauze dressing applied if indicated. A dressing will be indicated if the operation has been at all severe, in that the parts have been so disturbed that healing by first intention would not be likely. When a dressing is used from the first, we seem less likely to encounter the sluggish condition known as dry socket, which is only a step removed from necrosis. When dry socket exists the packing should, of



course, be maintained with irrigation at regular intervals and stimulating medicaments should be applied occasionally; either silver nitrate or aromatic sulphuric acid.

After-Creatment of Abscessed Ceeth.

The treatment of abscessed teeth after extraction is a point to which I particularly desire to call your attention. The tooth socket should be thoroughly irrigated with a non-irritating solution, after having used a curette and scraped the abscess cavity

in order to remove any pyogenic membrane or débris which might remain after the extraction. The socket having been thus cleansed, it should be lightly packed with iodoform gauze 5 per cent., and the dressing renewed and socket irrigated with an antiseptic solution in from twenty-four to forty-eight hours, and as often thereafter as may be necessary, according to the severity of the infection from the abscess.

Pain After Extraction.

One of the most frequent and distressing symptoms following extraction is pain—which may be of two characters, either from inflammation or neuralgia. If the origin of the pain is inflammatory,

time, with local applications of a soothing nature, will accomplish much. When the socket is exquisitely painful after the extraction of an abscessed tooth, I frequently give it a thorough swabbing with pure carbolic acid with good results, and by using a normal saline solution in the mouth as hot as can be borne every few minutes, together with cold applications or an ice bag on the outside of the face, our patient is soon comfortable.

When the pain is neuralgic in character, however, this treatment will not always succeed, and we may be compelled to resort to drugs. I have had remarkable success with the use of orthoform in these conditions, and would suggest its being freely tried before resorting to hypnotics. Its use should be carefully watched, however, as I have observed toxic symptoms in some cases. In such cases the symptoms invariably begin with a redness of the mucous membrane of the mouth, involving the soft palate and the fauces, with possibly a soreness of the throat. This is followed shortly by a rise of temperature, and the appearance of a measly rash of more or less severity. If the orthoform be withdrawn upon the appearance of the first symptoms, the result is not unpleasant. I have also observed that in most cases when the pain is neuralgic in character, if kept under control by the above-described method for a few days until the socket begins to granulate, the trouble ends.

Bemorrhage After Extraction.

Another common trouble after extraction is that of hemorrhage, perhaps not so common as it formerly was, because of our careful treatment after operation. The recurrence of bleeding is not likely, once



having been entirely stopped. In cases of persistent bleeding, however, the wound should be thoroughly cleaned with a curette and by irrigation, removing all blood clots and débris; then the bleeding point should be located if possible. Frequently it is some small blood vessel which has been wounded, but not entirely cut through, and by completely cutting it, its walls will contract in the usual way and the bleeding stop. In cases in which there is a persistent flow of blood, the source of which cannot be located, the wound should be tightly packed with a cotton plug, which plug must be held in place by means of an appliance if necessary. Firm and steady pressure properly applied will control the most obstinate case of bleeding.

All cases of an inflammatory nature should be followed up when possible, either personally or by referring the patient to his family dentist for treatment. Although the oral cavity has extraordinary resistive power against infection, I would not advise absolute reliance upon this fact. It is a crime the way some wounded mouths are neglected—usually through ignorance of the patient and lack of forethought on the part of the operator in not suggesting a return for postoperative treatment. I would strongly urge you to bear this point in mind and in all but the most simple cases of extraction I would have the patient return at least once for inspection, twenty-four to forty-eight hours after the operation, even when no treatment is indicated. In this way much trouble and discomfort can be averted, and from my experience, I know that patients are extremely thankful for this extra attention.



When the writer was but a lad there were only two classes of dentists, viz.: professional men and quacks. There were few dental colleges and few, if any, laws regulating or limiting the practice of dentistry. In spite of this lack of legislative distinction, the line was sharply drawn between professionalism and quackery. The veriest layman knew who the quacks were, and the quacks eked out a precarious livelihood working for the very poor or the very ignorant.

Nowadays the quacks, or those who would come within the old definition, ride in automobiles. Some even have as many as three motor cars; the touring car for summer, the limousine for winter, and the runabout for rapid transit between their various "parlors." No longer do the quacks extract pennies from the ignorant only; many with expensive pamphlets, published as veritable editions de luxe, beguile even the most cultured flies into their "parlors," using the names of prominently known members of the business world, the bar, and even of the ministry as satisfied clients. What has brought about this revolution? The dental profession and statutory law; the selfishness and dereliction of the dental profession toward their sacred public duty, and the inefficiency of statutes both in their requirements and in their enforcement.



Cheoretical Intent of Dental Statutes.

In theory the dental law is enacted to safeguard the health of the community by protecting citizens from incompetency and quackery. There is no doubt that the laws have increased the efficiency of dental service by elevating the standards, but the law.

has signally failed thus far to protect the public from quackery, pretence and fraud. Before we had laws the public knew who were the quacks; now the citizen believes, and has a right to believe, that all men publicly announcing themselves to be dentists have received the sanction of the Board of Dental Examiners.

For the honor of the Boards of Examiners, and for the honor of American dentistry, therefore, it now behooves us to revise our statutes, so that the citizen may be as safe when entering a dental office as he now may think that he is.

Che Weakness of Our Statutes.

By the creation of Boards of Dental Examiners and by their examination of the product of the dental schools before granting licenses to practice, our laws have done much to increase the efficiency

of the colleges, and to that extent have improved the quality of service rendered to the public. But no law that human mind can devise will compel all men to be honest, or honorable, or professional. Moreover, it is a sad fact that a lack of moral integrity often is associated with a keen mental equipment and considerable operative skill. Such men easily pass both college and examining board. Having, perhaps, considerable ability as dentists, but no sense of professional honor, these men use their dental education and their dental licenses not primarily with the purpose of doing the best that can be done for the patient, but rather with the idea of getting the largest fee at the least cost in time and work for themselves. The public, knowing little of dentistry, and having no means of measuring the true value of the service rendered, is easily gulled, and these well-dressed, pleasant-mannered, dental "bunco men" soon build up practices that they cannot care for with one pair of hands. Then they begin hiring assistants, and, having no sense of right and wrong, they unhesitatingly engage unlicensed men. This is one manner in which the legalized quack harbors and encourages the illegal practitioner. Of course, there are illegal practitioners of other sorts, and there



are quacks of less refinement and of less or no dental skill. But each and all are a menace to the public health, and it is the great public duty of our profession as quickly as may be to rid our communities of these pests.

Dangers of Illegal Practice. Before we can consistently ask our legislatures to enact more stringent laws than those that exist at present, we must be ready with the reason why. We are preaching mouth hygiene to the world, and

the world is listening with increasing attention. But a greater evil than the dirty mouth is the pus-breeding mouth. We have pus within the mouth from two sources, pyorrhea and alveolar abscesses. Of these the latter is the most dangerous, because it may exist without the knowledge of the patient. Frequently an abscess escapes the attention of even a competent dentist until he discovers it with a radiograph. Such abscesses are always due to incompetent dental attention. These so-called "blind abscesses" are invariably a contamination to the general system, the more dangerous and the more insidious because unsuspected. The patient is being daily infected, with the result that there is a general disturbance which disorganizes the physiological routine. The vital resistence is lowered. Then the subject may be brought into contact with some more serious infection, and he succumbs because of his inability to combat the disease.

During the great cholera epidemic in Europe a number of years ago a young French physician, in perfect physical health, in order to prove that an entirely sound human organism is immune to scourges of this character, visited the stricken territory, served the sick, and eat, drank and worked with absolutely no sanitary precautions beyond his daily bath, and with no evil result. Few men could do this, because few are physically sound, but just in proportion as a man may be physically unsound does he become prone to disease, and that man who carries about with him an unclean mouth, or a mouth in which septic conditions exist because of incompetent dentistry, not only is risking his own life and health, but is a constant menace to others because, by being infected himself, he spreads infection as he walks.

Lawmakers, district attorneys, and judges, therefore, must be taught that they are not dealing with a trifling offense, but that they are trifling



with the health and lives of the people; and once they are convinced of this they will surely work with us to stamp out the evil. But it is our duty to inaugurate the movement and to suggest laws that will be adequate to meet the conditions.

Michigan's Solution of the Problem.

The best solution of this great problem thus far found is presented in the new statute now under consideration by the State of Michigan, a copy of which appears in this issue. Let us enumerate and briefly consider the most important features. In Sec-

tion I, the use of a corporation name, or the practice of dentistry by a corporation, is specifically forbidden. This is a wise and essential provision. It is wise because it removes all doubts from the minds of judges, who in other States are obliged to be governed by precedent or previous opinions of other judges. It is essential in view of the requirement of annual registration, which is made compulsory. If a legal practitioner is compelled to practice under the name used in registration his identity is never in doubt, and the ownership of the dental office may always be easily established.

Section 4 empowers the Board to revoke or suspend a man's license under stated conditions, one cause being unprofessional conduct, which is amply defined. This is an important provision, and the welfare of the community demands its enactment. By this means, and by this means only, can the dentist who has passed his college and his examining board, but who nevertheless adopts disgraceful methods of practice be brought within the control of the police power of the State. This clause in the Michigan law will be an effective means of preventing that class of practice which is quackery, though heretofore legal; which is fraudulent, though technically within the law in other States. Once let it be understood that for unprofessional conduct a dental license may be revoked, and unscrupulous men will seek other fields in which to conduct their nefarious methods.

Section 5 provides for annual registration, and the payment of one dollar per year for such registrations. This is the best provision in the entire statute. It will greatly lessen the chances for illegal practice and greatly facilitate the discovery, conviction and punishment of those that endeavor to evade the law. In conjunction with Section 7, the method



of proceeding against illegal practitioners is greatly simplified. In this latter section we find the practice of dentistry defined. This definition of dentistry is an important feature which is lacking in nearly all statutes. This particular definition might be improved on; as the law reads it would require a learned judge to determine whether the "dental nurse" is prohibited or not. If a dental nurse, for example, were restricted by her employer to the cleansing of the exposed surfaces of teeth, it would be for the judge to decide whether such cleansing of teeth constituted a "dental operation" or not. Some judges and some dentists would say "Yes" to this, and others would say "No." Ambiguity should be removed from all statutes. In this instance the dental nurse should either be definitely prohibited or definitely legalized and the sphere of her work described. But on the whole Section 7, even as it stands, furnishes some valuable points. We are told that if a man use the word "Dentist," or the letters "D. D. S.," or if he advertise in any manner that he is engaged in the practice of dentistry, then he is practicing dentistry. If he is unregistered he is an illegal practitioner.

It certainly seems a sane and sound rule that if a man should advertise that he is a dentist, and if he is maintaining a dental office, that he may be held to be practicing dentistry. Yet in New York State he may publish the most blatant claims as to his skill and ability as a dentist and do this daily in the public press; he may have a suite of rooms with dental equipment everywhere, and yet he may defy the law unless he can be brought into court and made to face credible witnesses who swear that he actually did dental service in their mouths.

In this regard the statute of New York and of other States is wholly inadequate, and really stupid. The most conscientious attempts of our law committees accomplish nothing in stemming the tide. Occasional convictions are obtained, but a comparatively few are driven out of practice. Usually a fine is paid, a fine absurdly low in proportion to the magnitude of the offense, and the "convict" goes back to his dental parlors and resumes his illegal practices, safer than before, because he has become acquainted with the spies of the law committee. Moreover, such statutes invite and tempt weak men to practice the modern art of graft.

One of the detectives employed by the law committee of the Second District Dental Society in the State of New York was recently caught



red-handed accepting money from an illegal practitioner, in exchange for which he burned a spurious warrant of arrest. This man may go to jail, but this will not hinder others from promising immunity to illegal practitioners, and it is a well-known fact that such graft is constantly and continuously collected in the Empire State. This is a disgrace, the greater because it is largely due to the statute now in force.

If the proposed Michigan statute is enacted and then competently enforced Michigan should be cleared of illegal dentists within three years. This could really be easily accomplished. The following would be the simple but effective causes that would lead to this result. First: Every legal practitioner must register annually. This accomplishes two important things. (a) It provides an annually revised list of those entitled to practice. (In New York State men have been found "practicing" years after they had died and been buried.) (b) It provides a sufficient sum of money with which to defray the expense of detecting and convicting the illegal practitioners.

Second: If a man be suspected of illegally practicing, the new law permits any properly authorized officer to walk into his place and ask why his name does not appear on the register. If he cannot explain satisfactorily, he is at once convicted of breach of the statute. In other words, it removes the burden of proof; it compels the practitioner to prove his legal right to practice by the simple process of showing his license, failing which, he can be punished.

Third: There can be no quibble as to whether or not the man is a dentist. Dentistry is defined in a manner that renders it impossible for the illegal man to advertise himself, without which he cannot prosper, except as the hired man of another.

Fourth: Supervision of quackery is provided for and revocation of license permitted. Thus when the registered man utilizes the services of the unregistered man he risks the loss of his own legal standing. Consequently, the law officer may walk into a legal practitioner's office and ask to see the licenses of all his assistants. If such licenses cannot be shown, the unregistered man may be punished, but better still, the legal practitioner by such act becomes an illegal practitioner and may also be closed up. Because of this the licensed dentist will find it unprofitable to hire unlicensed men.

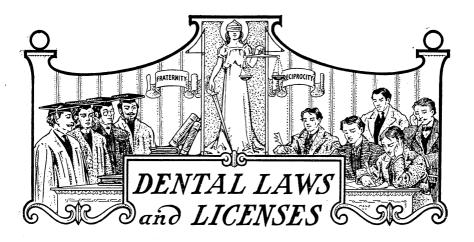
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It becomes evident at once that with such a statute as Michigan proposes the future quality of dental service within the State will depend entirely upon, (a) the ability of the Board of Examiners, and, (b) the enforcement of the law.

Some have declared that a dental license once granted is a license in perpetuity and cannot be revoked, and therefore that such provision as is proposed in this Michigan law would be unconstitutional.

This is a claim that a layman always makes against any new law that seems objectionable to himself. In this instance there is little doubt that such an act would be constitutional, and within the police rights of the State in protecting the public health. Not only this, but competent legal authority has declared that such an act can be immediately enforced against dentists already in practice. The following States already have annual registration: California, Oregon, Montana, Minnesota, Wisconsin, Kentucky, New Jersey, and West Virginia. Illinois has biennial registration. In California each dentist registers his name each year with the Secretary of the Board and pays a fee of two dollars. In Montana the fee is four dollars. In Illinois one dollar every two years. In the other States one dollar annually. Thus there seems ample reason to believe that Michigan may enact such a law if she wishes. Let us hope that the respectable dentists of Michigan will unite solidly to support this law and afterwards cheerfully pay the annual registration fee, and thus help to cleanse the State of illegal practitioners.



Proposed New Dental Law for Michigan. # Bill.

To amend Sections I. 2, 3, 4, 5, 7, 8 and 9 of Acts 333 of the Public Acts of 1907, entitled "An Act to provide for the examination, regulation, licensing and registration of persons engaged in the practice of dentistry, and for the punishment of offenders against this act, and to repeal all acts and parts of acts in conflict herewith."

The People of the State of Michigan enact:

Section I. Sections I, 2, 3, 4, 5, 7, 8 and 9 of Act No. 338, of the Public Acts of 1907, entitled "An Act to provide for the examination, regulation, licensing and registration of persons engaged in the practice of dentistry, and for the punishment of offenders against this act, and to repeal all acts and parts of acts in conflict herewith," are hereby amended to read as follows:

Tllegal Practice. Section I. It shall be unlawful for any person not a registered dentist within the meaning of this act (to own, rent, operate or control any room or rooms, office or dental parlors, where dental lad or contracted for) to practice dentistance and lad or contracted for) to practice dentistance and ladder.

work is done, provided or contracted for) to practice dentistry or dental surgery in any of its departments in the State of Michigan, except as Thereinafter provided.

Dental Corporations Forbidden. It shall be unlawful for any person or persons whether registered or not to operate or run any dental office or parlors under any name or corporation name other than the name to whom the license is issued.

Composition of Board of Examiners.

Section 2. The Governor shall appoint, by and with the advice and consent of the Senate, five resident electors of the State, who shall constitute a Board of Dental Examiners. Such appointments shall be made from a list of twenty

names submitted to the Governor annually by the Michigan State Dental



Society, which said list shall be selected in open meeting of the Michigan State Dental Society, and shall contain only the names of electors and reputable dentists and graduates of a reputable dental college who have resided in this State for at least five years and have at least five years experience in their profession.

Such list is to be certified under oath of the secretary of the abovenamed society, as to the qualifications as above set forth, of each person named therein, and filed in the office of the Secretary of State, at Lansing, on or before the fifteenth day of September of the present year, and each and every year thereafter. In the event that the secretary shall for any cause neglect, omit or refuse to file as aforesaid such list. then and in that case the Governor shall appoint or fill the vacancies on said Board without reference to such list, which the aforesaid society has for any cause neglected, omitted or refused to file with the Secretary of State, as herein mentioned aforesaid, but the qualifications of the persons appointed shall be the same as above set forth. The members of the Board holding office at the time of the passage of this Act, shall be continued in office, as members of the State Board of Dental Examiners, until the expiration of the term for which they have been appointed. On January 1, 1914, and annually thereafter, the Governor shall appoint in the manner aforesaid one member of said Board, whose term of office shall be for a period of five years. The several members of said Board shall hold office until their respective successors are appointed and qualified, and if any vacancy occurs in said Board another shall be appointed as aforesaid to fill the unexpired term thereof.

Said Board shall have full power to make By-Laws and necessary regulations for the proper fulfilment of their duties under this act. It shall choose one of its members president and one secretary-treasurer and shall hold two regular meetings each year, at such dates and places as may be deemed best. Special meetings may also be held. A majority of the Board shall constitute a quorum for the transaction of business. Said Board shall keep a full record of its proceedings and a full registry of all persons licensed and certified as dentists by said Board, which shall be public records and at all times open to inspection as such.

A transcript of any of the entries in such record, certified by the secretary-treasurer under the seal of said Board, shall at all times and places be competent evidence of the facts therein stated. The members of said Board shall have the power to administer oaths and hear testimony in all matters pertaining to the duties imposed upon it by law. Said Board shall make an annual report of its proceedings to the Governor on or before the first day of January in each year, which report shall contain a full and complete record of all its official acts during the year immediately preceding, as well as an itemized statement of all receipts and disbursements. A sufficient number of copies of such reports shall be printed in the same manner as other reports of State Officers and Boards are now printed, under Act No. 44, of the Public Acts of 1894, as amended, to supply the office of the Secretary of State with one hundred copies for future distribution, and as many copies for use and distribution under the direction of the said Board as the said Board may deem necessary, but the whole number of copies printed and



published shall not exceed twenty-five hundred; provided, that not to exceed two hundred copies shall be bound in any other binding than paper; provided, further, that the cost of said printing and binding, after audit an allowance by the State Board of Auditors, shall be covered back into the State Treasury by the Board of Dental Examiners.

Qualifications for Examination.

Section 3. All persons who desire to begin the practice of dentistry in this State after the passage of this Act, and who shall have a license from the Dental Board of another State (requiring

preliminary education before examination for license equal to the standard required of applicants for examination for registration in this State), or who shall have received a diploma from the faculty of some reputable dental college, duly organized under the laws of this or any other State of the United States, shall have the right to apply to the Dental Board of this State for examination as to their proficiency, and all successful applicants shall be licensed and registered by said Dental Board, provided, that nothing in this Act shall deprive a candidate who has already appeared before the Board and failed on examination from the privilege of re-examination.

Reputable College Defined. Said Dental Board shall be authorized to ascertain and determine what shall constitute a dental college or institution in good standing and repute, but no such dental institution shall be considered reputable unless the same shall possess the following

qualifications.

First. It shall be chartered under the laws of the State in which it is located and operated and shall be authorized by its charter to confer degrees of Doctor of Dental Surgery or Doctor of Dental Medicine.

Second. It shall deliver annually a full course of lectures and instructions by competent faculty and corps of instructors in the following subjects. Anatomy, Chemistry, Physiology, Histology, Materia Medica, Therapeutics, Dental Metallurgy, Pathology, Bacteriology, Operative Dentistry, Prosthetic Dentistry, Crown and Bridgework, Orthodontia and Oral Surgery and Hygiene, said course of instruction to consist of not less than three terms in separate academic years and of not less than thirty-two weeks, of six days for each week, and shall require its matriculates to have a preliminary education of at least four years in a credited high school, college or university of equal standard.

Third. The apparatus and equipment of each said dental college or institution shall be ample and sufficient for the ready and full teaching of the above-named subjects, and every such college shall allow said State Board of Dental Examiners of this State the privilege of inspect-

ing its work and equipment at any time.

Revocation of Suspension of License.

SECTION 4. Any dentist may have his license revoked or suspended by the Board of Dental Examiners for any of the following causes:

First. His conviction of a felony or misdemeanor involving moral turpitude, in which case a

record of conviction or a certified copy thereof, certified by the clerk of the court or the judge in whose court the conviction is had, shall be conclusive evidence.

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Second. For unprofessional conduct or gross ignorance or inefficiency in his profession.

Unprofessional Conduct Defined. Third. Unprofessional conduct shall mean, employing what are known as "carpers" or "steerers" to obtain business, or of obtaining of any fee by fraud or misrepresentation; wilfully betraying professional secrets, employing directly or indirectly suspended or unlicensed dentist to perform opera-

any student or any suspended or unlicensed dentist to perform operations of any kind, or to treat lesions of the human teeth or jaws, or to correct malposed formations thereof, except that an unlicensed person may perform merely mechanical work upon inert matter in a dental office or laboratory; the advertisement of dental business or treatment or devices in which untruthful, improper or impossible statements are made, or habitual intemperance or gross immorality.

Method of Revoking Licenses. The proceedings for revoking or suspending any license under the first subdivision of this section must be taken by the Board, on receipt of a certified copy of the record of conviction. The proceedings under the second subdivision of this section

may be taken upon the information of another. All accusations must be in writing, verified by some party familiar with the facts therein charged and three copies thereof must be filed with the Secretary of the Board. Upon receiving the accusation the Board shall, if it deem it sufficient, make an order setting the same for hearing and requiring the accused to appear and answer thereto, at said hearing, at a specified time and place, and the Secretary shall cause a copy of the order of the accusations to be served upon the accused at least twenty days before the day appointed in the order for said hearing, either personally or by registered mail. The accused must appear at the time appointed in the order and answer the charges and make his defence to the same, unless for sufficient cause the Board assign another day for that purpose. If he does not appear the Board may proceed and determine the accusation in his absence. If the accused pleads guilty or refuses to answer the charges, but upon the hearing thereof the Board shall find them, or any of them true, it may proceed to a judgment revoking his license or suspending it. The Board shall have power to administer oath, take the depositions of witnesses, in the manner provided by law in civil cases, and to compel them to attend in person before it the same as in civil cases, by subpæna issued from the signature of the same and the seal of the Board, and in the name of the people of the State of Michigan. Upon the revocation of any license the facts shall be noted upon the records of the Board of Dental Examiners and the license shall be marked as cancelled upon the date of its revocation.

Rules for tion as provided in this Act shall file application in writing, supported by affidavit, stating the facts which entitle him or her to such examination, and each applicant shall, before taking said examination, present to said Board his or her license or diploma for verification as to its genuineness. All applicants for examination shall, at the time of making such applica-



tion, pay to the Secretary-Treasurer of the Dental Board a fee of \$20, and each applicant shall present himself before the said Dental Board for examination at the first or second regular meeting after his application shall have been made, and in default thereof said fee shall be forfeited to said Dental Board. The fee for any subsequent application for examination or re-examination shall be \$10. The examination may be written or oral, or both, at the option of said Board and shall include the following subjects: Anatomy, Chemistry, Physiology, Histology, Bacteriology, Operative Dentistry, Prosthetic Dentistry, Crown and Bridgework and Oral Surgery, Orthodontia and Oral Hygiene. The examination paper of each applicant, with his or her name appearing thereon, shall be preserved by said Board for a period of six months from and after the date of the writing of said examination paper and shall be subject to public inspection.

Reconsideration of Examination Papers Provided.

During the period of six months if any unsuccessful applicant so desires he or she may upon the deposit of \$50 with said Board of Dental Examiners have the privilege of having his or her examination paper re-read, by said Board of Dental Examiners,

in presence of his or her representative, and if upon re-reading said applicant's paper shall be determined by said Board of Examiners to be of sufficient percentage to entitle such applicant to the license to practice in this State, then said Board of Dental Examiners shall refund said unsuccessful applicant the sum of \$50 deposited with said Board of Dental Examiners for the purpose of securing a re-reading of said applicant's paper. All persons of good moral character who shall successfully pass such examination shall be licensed and registered by said Dental Board and shall receive a certificate of such license and registration duly authenticated by the signature of the members of the Board and with the seal of said Board attached; and in no case shall said examination fee be refunded but said Dental Board may, for sufficient cause, remit said fee for subsequent re-examination.

Licenses and Annual Registration. Every registered dentist shall on or before the first day of May of each year, except the one in which he is registered, pay to the Secretary of the Board of Dental Examiners a license fee of \$1. The year for which a fee shall be paid shall begin

on October 1st, following the May when it becomes due, and end the succeeding September 3oth. In case any person defaults in paying said fee his license may be revoked by the Board of Dental Examiners on thirty days' notice in writing from the secretary, unless within said time said fee is paid. Upon the payment of said fee the Board shall reinstate the delinquent license. On or before the first day of July each year the Secretary of the Board shall send to the County Clerk of each county in the State a certified list of all practicing dentists therein, who have paid said fee, and the clerk shall enter or paste the same in the register of said dentists.

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Dental Practice Defined. SECTION 7. All persons shall be said to be practicing dentistry within the meaning of this act who shall use the word or letters "Dentist," "D. D. S." or any other letters or title in connection



with his name, which in any way represents him as engaged in the practice of dentistry, or who shall advertise or permit it to be done by sign, card, circular, handbill, newspaper or otherwise, that he can or will attempt to perform dental operations of any kind, treat disease or lesions of the human teeth or jaws or replace lost teeth by artificial ones, or attempt to correct malposition thereof, or who shall for a fee, salary or other reward paid or to be paid, either to himself or to another person, perform dental operations of any kind, treat diseases or lesions of the human teeth or jaws, or replace lost teeth by artificial ones or attempt to correct malposition thereof.

But nothing contained in this act shall be taken as applying to the Acts of legally qualified physicians in the extraction of teeth, in the performance of their duties as such, or to acts of bona fide students of dentistry in the college building in the pursuit of clinical advantages while in attendance upon a regular course of study in a reputable dental college. Any licensed dentist owning, running, operating or controlling any room or rooms, office or dental parlors, where dental work is done, provided or contracted, who shall employ, keep or retain any unlicensed dentist or student as an operator shall be guilty of a misdemeanor and

punished as provided in Section 10.

Section 8. Out of the funds coming into possession of said Board, as above specified, the members of said Board may receive as compensation the sum of \$10 for each day actually engaged in the duties of their office as such examiners and actual necessary expenses. Said expenses shall be paid from the fees and assessments received by said Board, under the provisions of this Act, and no part of the salary or expenses of said Board shall be paid out of the State Treasury. The Secretary-Treasurer of said Board shall from time to time give such bond for the faithful discharge of his duties as the custodian of funds of said Board as it may direct. Said Board shall appropriate from any fund under its control a sum not to exceed Five Hundred Dollars annually, as compensation for the services of the Secretary-Treasurer. All moneys received in excess of said per diem allowance and mileage, as above provided for, shall be held by the Secretary-Treasurer of said Board as a special fund for other expenses of said Board and for carrying out the provisions of this Act.

Punishment of Illegal Practitioners.

Section 9. Any person who shall practice or attempt to practice dentistry, either as proprietor, employee or assistant without having a license, or without having his license renewed, as provided by Section Five of this Act, or without keeping his

license in open view in his operating room shall be punished by a fine of not less than fifty dollars nor more than two hundred dollars or by confinement in the county jail not less than twenty days, or by both such fine and imprisonment. It is hereby made the duty of the prosecuting attorney of each county in the State to prosecute every case to final judgment whenever his attention shall be called to a violation of this Act.



SOCIETY ANNOUNCEMENTS

National Society Meetings

National Dental Association, Kansas City, Mo., July, 1913.

American Society of Orthodontists, Chicago, Ill., July, 1913.

Institute of Dental Pedagogics, Pittsburgh, Pa., January 30, 1913.

State Society Meetings.

ARIZONA DENTAL SOCIETY, Phœnix, Ariz., November, 1913. Secretary, Dr. H. Wilson, Phœnix, Ariz.

CONNECTICUT STATE DENTAL ASSOCIATION, Waterbury, Conn., April 15, 16, 1913. Secretary, Dr. A. V. Prentis, New London, Conn.

GEORGIA STATE DENTAL SOCIETY, Columbus, Ga., June 12, 13, 14, 1913. Secretary, Dr. DeLos L. Hill, Grant Bldg., Atlanta, Ga.

ILLINOIS STATE DENTAL SOCIETY, Peoria. Ill., May 13, 14, 15, 16, 1913. Secretary, Dr. H. L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 20, 21, 22, 1913. Secretary, Dr. Otto U. King, Huntington, Ind.

MICHIGAN STATE DENTAL SOCIETY, Grand Rapids, Mich., April 10, 11, 12, 1913. Secretary, Dr. F. Ward Howlett, Jackson, Mich.

MINNESOTA STATE DENTAL ASSOCIATION, Secretary, Dr. Benjamin Sandy, Syndicate Bldg., Minneapolis, Minn.

MISSOURI STATE DENTAL ASSOCIATION, Kansas City, Mo., July, 1913. Secretary, Dr. S. C. A. Rubey, Warrensburg, Mo.

Nebraska State Dental Society, Omaha, Nebr., May 12, 13, 14, 15, 1913. Secretary, Dr. Wm. A. McHenry, Nelson, Nebr.

New York State Dental Society, Albany, N. Y., May 8, 9, 10, 1913. Secretary, Dr. A. P. Burkhart, 52 Genesee St., Auburn, N. Y.



Pennsylvania State Dental Society, Philadelphia, Pa. Secretary, Dr. L. M. Weaver, 7103 Woodland Ave., Philadelphia, Pa.

TENNESSEE STATE DENTAL ASSOCIATION, Nashville, Tenn. Secretary, Dr. C. O. Rhea, Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Temple, Texas, May 15, 16, 17, 1913. Secretary, Dr. J. G. Fife, Dallas, Texas.

VERMONT STATE DENTAL SOCIETY, Burlington, Vt., May 21, 22, 23, 1913. Secretary, Dr. P. M. Williams, Rutland, Vt.

VIRGINIA STATE DENTAL SOCIETY. Secretary, Dr. C. B. Gifford, Taylor Bldg., Norfolk, Va.

Wisconsin State Dental Society, Madison, Wis., July 8, 9, 10, 1913. Secretary, Dr. O. G. Krause, Wells Bldg., Milwaukee, Wis.

New York State Dental Society.

The forty-fifth annual meeting of the Dental Society of the State of New York will be held at Albany, N. Y., Thursday, Friday and Saturday, May 8, 9, and 10, 1913.

The first session will open on Thursday, at 10.30 A. M.

A cordial invitation is extended to all ethical dentists in New York and sister States.

Exhibitors wishing to engage space please address Dr. J. Gross, Schenectady, N. Y.

A. P. Burkhart, Secretary.

No. 52 Genesee Street, Auburn, N. Y.

